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MEMORANDUM

TO: John Mitnik, Chief, Engineering and Construction Bureau
Paul Linton, Administrator, Water Control Operations Section

FROM: SFWMD Staff Environmental Advisory Team

DATE: April 19, 2016

SUBJECT: Weekly Environmental Conditions for Systems Operations

Summary

Kissimmee

On Sunday, stage in East Lake Toho was 0.1 feet below schedule and Toho was at schedule; Kissimmee-Cypress-Hatchineha was at schedule. Over the past week, discharge at S65 averaged 1,812 cfs and at S65A 1,710 cfs; discharge at S65E averaged 2,766 cfs. Tuesday morning discharges: S65 ~2,471 cfs; S65A ~2,329 cfs; S65C ~2,101 cfs; S65E ~2,027 cfs. Dissolved oxygen in the Kissimmee River averaged 3.82 mg/L over the past week and 4.26 mg/L on Sunday. Kissimmee River mean floodplain depth is currently 1.08 feet.

Lake Okeechobee

The recession in Lake stage continued last week and the Lake dropped 0.20 feet. The Lake is at 14.65 feet NGVD and is in the Low Flow Sub-band. Ecological conditions for wading birds and other species in the nearshore region remain poor but may improve if the recession continues.

Estuaries

In response to rainfall during the past week, total freshwater inflow to the St. Lucie Estuary increased, averaging 1,940 cfs with 981 (51%) coming from Lake Okeechobee. Salinity remained in the fair range for adult oysters at the US1 Bridge. Total freshwater inflow to the Caloosahatchee Estuary decreased over the past week and averaged 3,055 cfs with 2,363 (77%) coming from Lake Okeechobee. Salinity conditions in the upper estuary are suitable for tape grass. At the Cape Coral Bridge, salinity is in the fair range for adult oysters and in the good range at the Shell Pont and Sanibel Causeway monitoring sites. The 30-day average salinity at the I-75 Bridge is below 5 and forecast to remain so for the next two weeks.

Stormwater Treatment Areas

Over the past week, the STAs/FEBs received approximately 7,200 acre-feet of Lake regulatory releases. The total amount of Lake regulatory releases sent to the STAs/FEBs in WY2016 (since May 1, 2015) is approximately 226,600 acre-feet. All STA cells are near or above target depths and operational restrictions are in place for vegetation rehabilitation in STA-1E, STA-1W, STA-3/4 and STA-5/6. In addition, nests of ESA-protected Everglade Snail kites have been observed in STA-1E and STA-2 as well as in STA-5/6. This week, if 2008 LORS recommends Lake releases to the WCAs and the conditions allow, releases will be sent to STA-1E and A-1 FEB. A-1 FEB releases will be sent to STA-2 and STA-3/4.

Everglades

Water levels have continued to decline throughout the Everglades this week. After twenty weeks of inundation, water levels in southern WCA-3A are below 2.5 feet, which should provide relief for the tree

island vegetation communities. Stages for the wading birds are still too high for foraging in most of the Everglades except WCAs 1 and 2A, and little nesting activity is underway. Most of the Cape Sable Seaside Sparrow habitats remain too wet for nesting. The 30-day moving average salinity at the Florida Bay MFL site remains low (1.4 psu compared to the average of 16 psu) and the cumulative inflow from the five creeks into Florida Bay is above the long-term average at 273,212 acre-feet. Florida Bay salinities are slightly below average for this time of year, which is desirable and a restoration target.

Weather Conditions and Forecast

Dry through Thursday. A blocking pattern over the U.S. and western Atlantic with two large “cut-off” lows spinning over the Midwest and near Bermuda is beginning to erode away. Moderate strength high pressure wedged between these two lows and will dominate our weather for the next few days with virtually dry conditions likely through Thursday evening. Next chance for showers/storms arrives on Friday when the tail end of the weakening central U.S. low pulls eastward and breaks down high pressure to likely allow a few seabreezes showers/storms then.

KISSIMMEE BASIN

Kissimmee Basin Rainfall

The Upper Kissimmee Basin received 1.30 inches of rainfall in the past week and the Lower Basin received 1.03 inches (SFWM Daily Rainfall Report 04/17/2016).

Upper Kissimmee Basin

Stages and departures in the Kissimmee Chain of Lakes (KCOL) are shown in Table 1.

Table 1. Departures from KCOL flood regulation (F) or temporary schedules (T, A, or S) (feet NGVD). Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date: 4/19/2016							Sunday Departure (feet)						
Water Body	Structure/Site	Discharge (cfs), week's average**	Stage Monitoring Site***	Lake Stage (feet)	Schedule*	Regulation (R) or Target (S or T) Stage (feet)	4/17/16	4/10/16	4/3/16	3/27/16	3/20/16	3/13/16	3/6/16
Lakes Hart and Mary Jane	S62	75	LKMJ	60.0	R	60.4	-0.4	-0.4	-0.5	-0.3	-0.4	-0.4	-0.4
Lakes Myrtle, Preston, and Joel	S57	50	S57	60.4	R	60.5	-0.1	0.0	0.0	0.4	-0.1	-0.1	-0.1
Alligator Chain	S60	212	ALLI	63.1	R	63.2	-0.1	0.0	0.0	0.4	-0.2	-0.3	-0.3
Lake Gentry	S63	292	LKGT	61.6	R	60.7	0.9	0.4	-0.7	0.3	-0.2	-0.2	-0.3
East Lake Toho	S59	344	TOHOE	56.7	R	56.8	-0.1	-0.1	-0.1	-0.1	-0.5	-0.7	-0.4
Lake Toho	S61	894	TOHOW	53.8	R	53.8	0.0	0.0	0.4	0.4	-0.4	-0.6	-0.5
Lakes Kissimmee, Cypress, and Hatchineha	S65	1812	LKISSP, KUB011, LKISSB	50.5	R	50.5	0.0	-0.2	-0.2	-0.1	-0.1	-0.2	-0.1

* T = temporary schedule, R = USACE flood control schedule, S = temporary snail kite schedule, A = projected ascension line, N/A= not applicable or data not available.

** Seven-day average of weighted daily means through Sunday midnight.

*** Names of in-lake monitoring sites and structures used to determine lake stage; if more than one site is listed, an average is reported.

DATA ARE PROVISIONAL

Lower Kissimmee Basin

Discharges and stages at Lower Basin structures are shown in Table 2. SFWDAT depth maps for the Phase I restoration area are shown in Figure 11. Kissimmee River floodplain stages at selected stations are shown in Figure 12.

Table 2. Mean weekly discharge at S-65x structures, and mean weekly Phase I area river channel dissolved oxygen and floodplain mean water depth. Discharge and stage data are provisional real-time data from SFWMD OASyS DualTrend; reported values are averages through midnight of the Sunday prior to the report date unless otherwise specified.

Report Date:		4/19/2016										
Metric	Location	Sunday's 1-day average	4/17/16	4/10/16	4/3/16	Weekly Average**						
						3/27/16	3/20/16	3/13/16	3/6/16	2/28/16	2/21/16	2/14/16
Discharge (cfs)	S-65	2164	1812	3289	5062	1668	402	505	1313	2770	2257	1997
Discharge (cfs)	S-65A	2136	1710	3395	5407	1461	280	408	1214	2817	2261	2223
Discharge (cfs)	S-65C	2215	2759	4387	2902	746	492	1237	2629	2850	2515	3805
Headwater stage (feet NGVD)		34.0	34.0	34.0	34.1	34.0	34.1	34.2	34.9	35.2	34.5	34.8
Discharge (cfs)	S-65D****	2328	2872	4648	2755	753	534	1375	2713	3112	2810	4355
Discharge (cfs)	S-65E	2202	2766	4507	2657	717	487	1360	2696	3101	2880	4513
DO concentration (mg/L)***	Phase I river channel	4.26	3.82	3.12	3.83	5.74	5.98	5.98	5.36	5.37	6.82	7.39
Mean depth (feet)*	Phase I floodplain	1.08	N/A	1.76	2.32	0.70	0.48	0.52	1.12	1.81	1.44	1.64

* 1-day spatial average from South Florida Water Depth Assessment Tool (SFWDAT).

** Seven-day average of weighted daily means through Sunday midnight.

*** DO is the average for PC62 and PC33 starting June 2. PC33 omitted for week of Aug16. DO for week of Sept 15-22 is for PC33 only.

**** S-65D discharge combines discharge at S-65D, S-65DX1, and S-65DX2

***** 1-day spatial average from field measurements in Pools A and BC

N/A Not applicable or data not available.

DATA ARE PROVISIONAL

Water Management Recommendations

Kissimmee Basin Adaptive Recommendations and Operational Actions

Date	Recommendation	Purpose	Outcome	Source
4/19/2016	No new recommendations.			
4/12/2016	No new recommendations.			
4/5/2016	No new recommendations.			
3/29/2016	No new recommendations.			
3/22/2016	No new recommendations.			
3/15/2016	No new recommendations.			
3/8/2016	No new recommendations.			
3/1/2016	No new recommendations.			
2/23/2016	No new recommendations.			
2/16/2016	No new recommendations.			
2/9/2016	No new recommendations.			
2/1/2016	Begin F&W recessions in East Toho, Toho, and KCH per the requested recession lines shown in the 2015-16 Dry Season Standing Recommendation (SR). Use Table 2 for guidance on rates of change in discharge to control departures from the line in KCH, and the reversal guidelines shown in the SR for Toho and East.	Initiate and manage lake stage recessions in East Toho, Toho, and KCH for the benefit of fish and wildlife, while avoiding harm to the Kissimmee River	TBD	KB Tech Team
1/20/2016	Continue to adjust discharge at S65 to follow the 2015-16 Dry Season SR guidelines for rampdown at S65A. Balance discharge at the two structures to maintain at least minimum discharge to the river. As stage rises above 51 ft in KCH, temporarily bypass the Fig 1 discharge plan in the SR and manage discharge to let KCH stage rise to 51.5 ft (the Feb 1 recession starting stage) if conditions allow while following rampdown guidelines. If KCH stage rises further than 51.5 ft, we will reevaluate. As changes in discharge become necessary, continue to follow the Table 1 guidelines in the SR. Switch to Table 2 rampup/rampdown guidelines on Feb 1 or when the recession line is intercepted for management of the recession in KCH.	If conditions allow, let stage increase to 51.5 ft to intersect the Feb 1 starting stage for KCH F&W recession line.	Implemented	KB Tech Team
12/10/2015	Temporarily raise from 50.5 ft to 51 ft the threshold stage for increasing discharge at S65/S65A to 1400 cfs. This is a temporary modification of the current draft 2015-16 dry season Standing Recommendation (SR). Discontinue last week's temporary change in the rate of discharge increase and return to the original per-day rates shown in Table 1 of the draft SR - i.e., increase discharge to 1400 cfs at a rate of 150 cfs/day rather than 150 cfs/2 days. If KCH stage should start to decline while ramping up but before reaching 1400 cfs, begin to ramp back down using the rates in Table 1.	Slow the effect of discharge on KCH stage, balance KCH stage and KRRP discharge objectives.	Implemented	KB Tech Team
12/9/2015	Maintain ~300 cfs at S65/S65A until average stage in KCH rises to 51 ft. This is a temporary modification of the current draft dry season SR raising the stage threshold for discharge rampup from 50.5 ft to 51 ft. Once stage reaches 51 ft, begin increasing discharge at a rate of 150 cfs/day per Table 1 in the draft 2015-16 Dry Season SR. Discontinue the temporary guidance provided below (12/2/2015) and return to the original guidelines for rate of discharge rampup per Table 1 (150 cfs/day rather than 150 cfs/2 days).	Slow the effect of discharge on KCH stage, balance KCH stage and KRRP discharge objectives.	Implemented	KB Tech Team
12/2/2015	Temporary modification of draft Dry Season SR for rainfall forecast the week of Nov. 30. If stage in KCH increases to 50.5 ft, begin increasing S65 discharge to 1400 cfs at a rate of up to 150 cfs per 2 days rather than every day – this is half the discharge increase rate in Table 1 of the draft 2015-2016 Dry Season SR.	The slower discharge increase rate is a temporary change that is intended to allow time to assess whether or not we have entered a wetter period that would allow 1400 cfs to be sustained.	TBD	KB Ops

KCOL Hydrographs (through Sunday midnight)

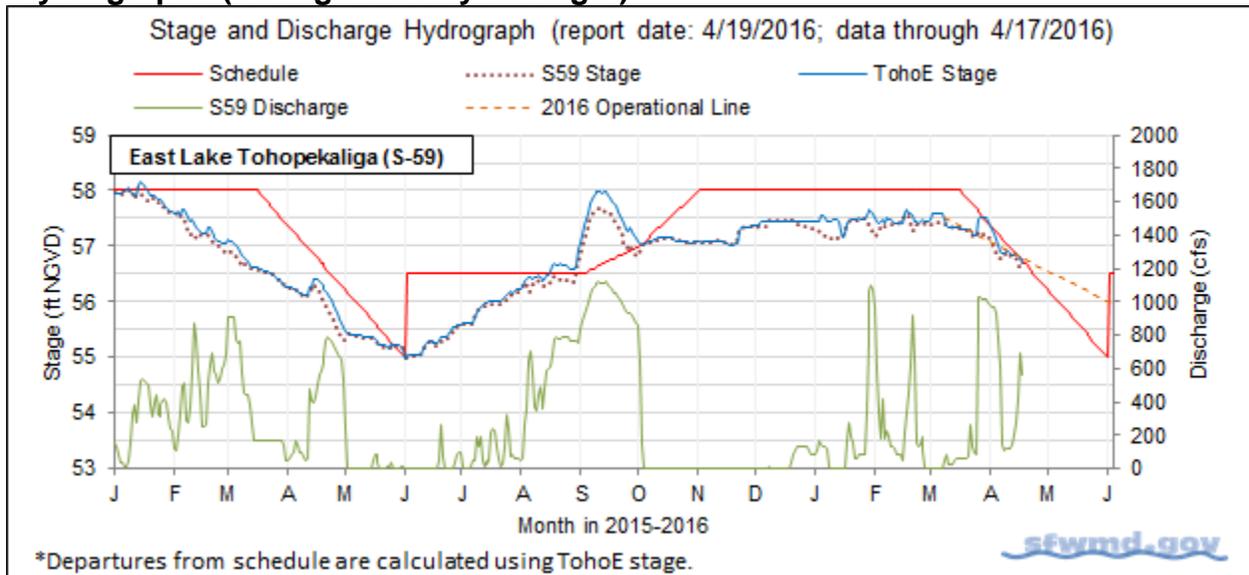


Figure 1.

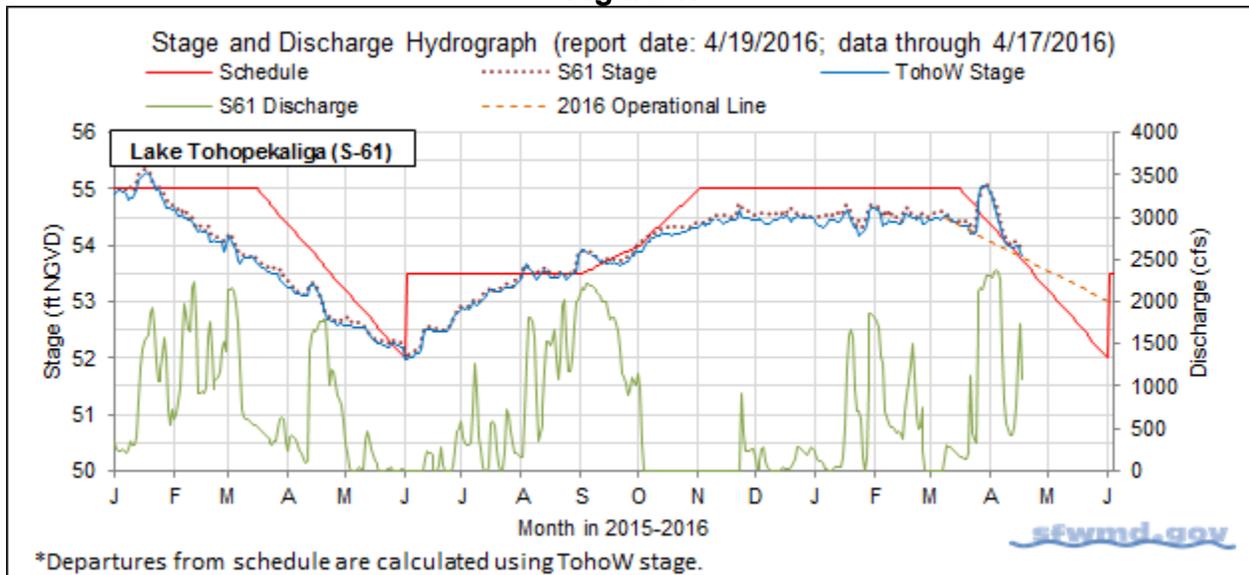


Figure 2.

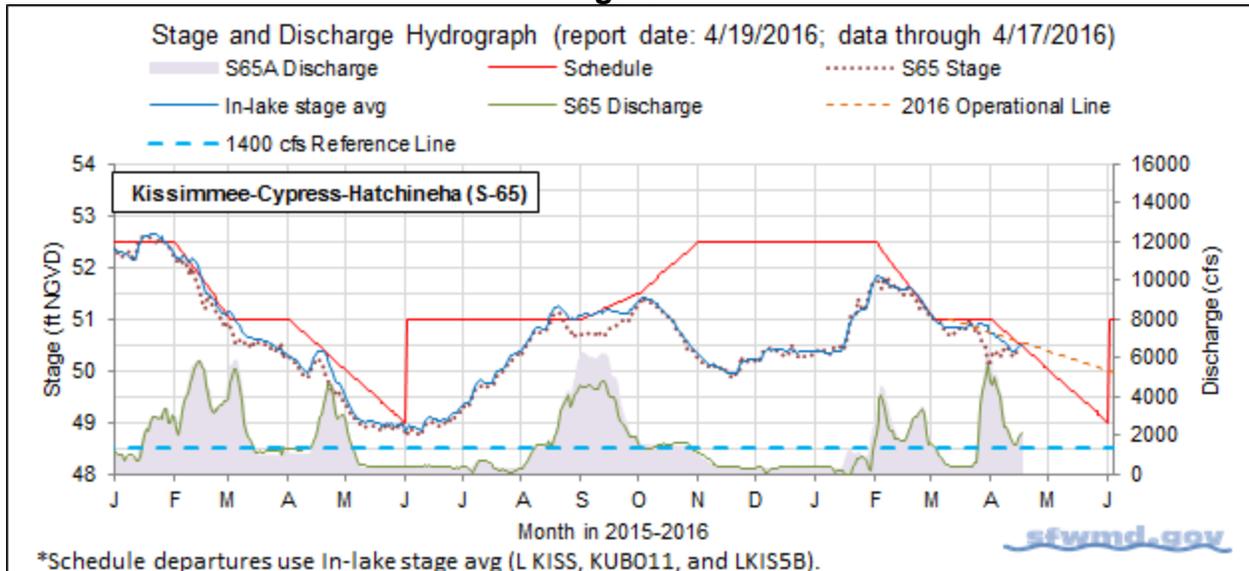


Figure 3.

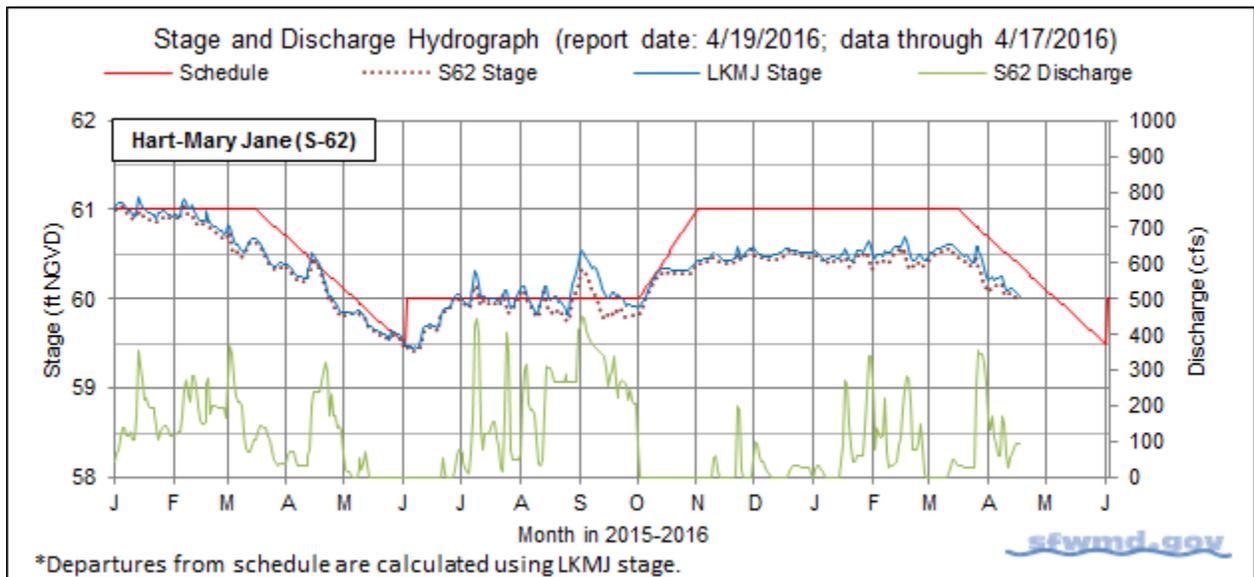


Figure 4.

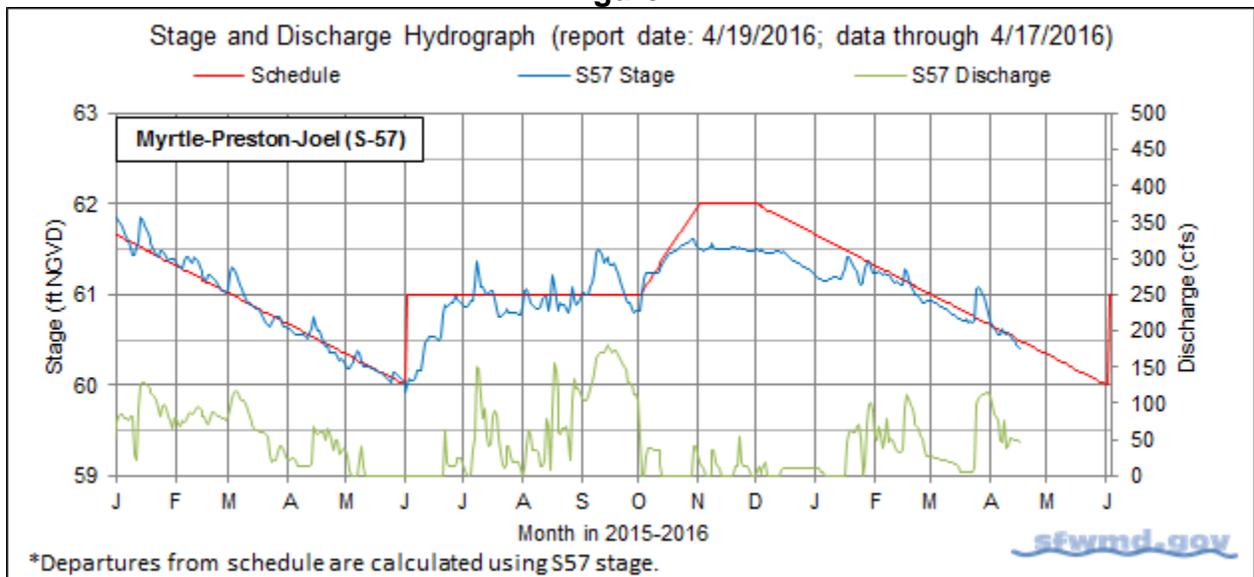


Figure 5.

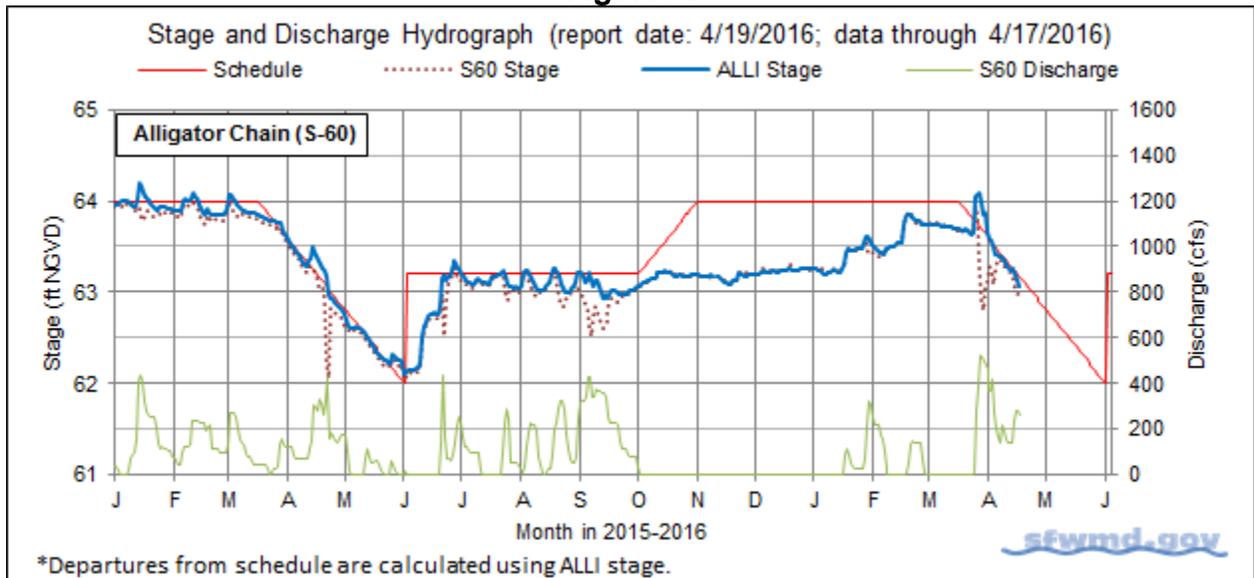


Figure 6.

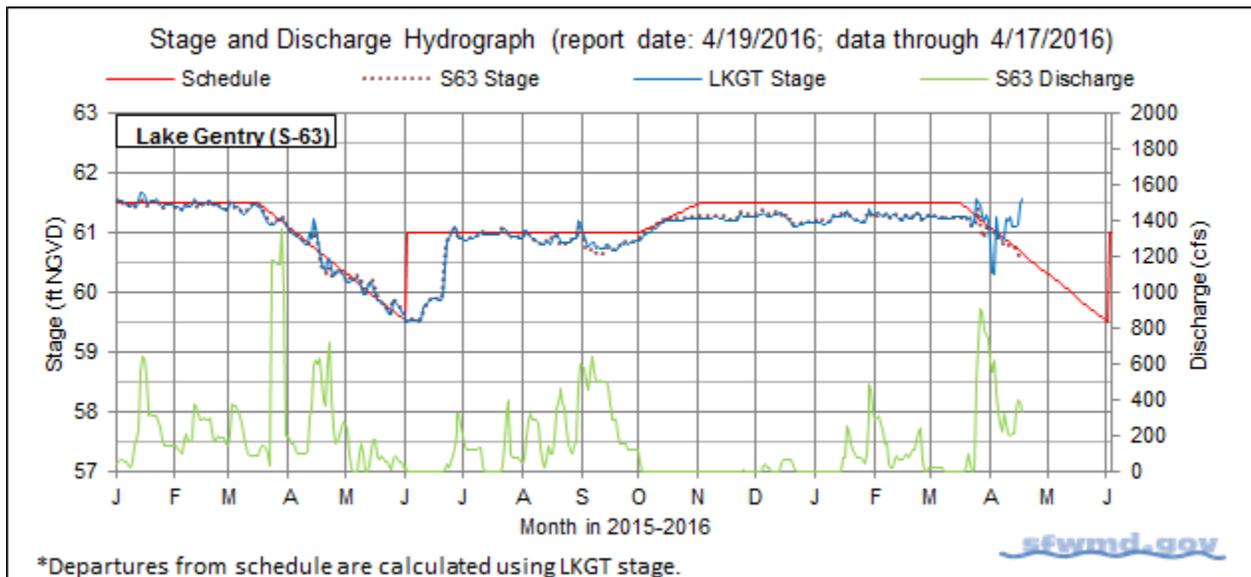


Figure 7.

Table 1. Discharge Rate of Change Limits for S65/S65A (Rate limits apply only in Zone B)			
	Q (cfs)	Maximum rate of increase (cfs/day)	Maximum rate of decrease (cfs/day)
Zone B	0-300	50	-50
	300-1400	150*	-75
	1400-2500	300	-300
	2500-3000	1000	-1000
Zone A	No limits		
*DRY FLOODPLAIN RULE. When the Kissimmee River floodplain is dry (>7 days at 300 cfs), increases above 1200 cfs should be made in consultation with LRE Operations (Steve Bousquin and David Anderson).			

Figure 8a. Limits on rate of discharge change at S65/S65A during F&W recession for dry season 2015-2016. Table 1 is from the 2015-2016 Dry Season Standing Recommendation.

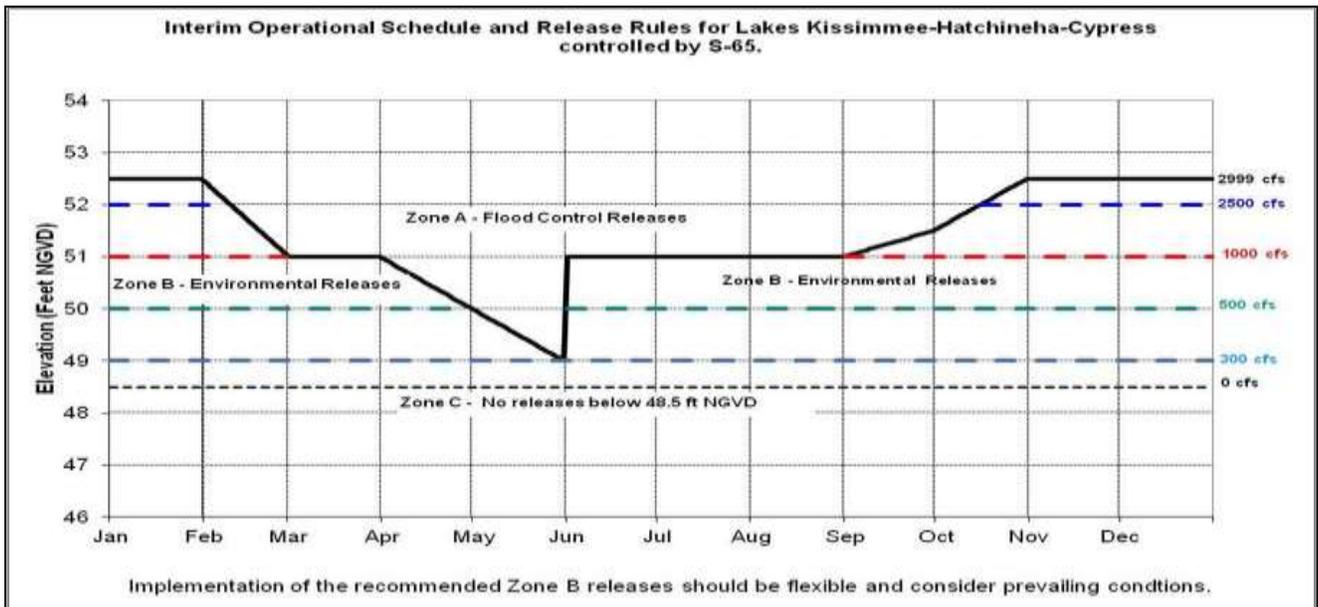


Figure 8b. Interim operations schedule for S-65. The discharge schedule shown to the right has not been used in recent years or in Wet Season 2015.

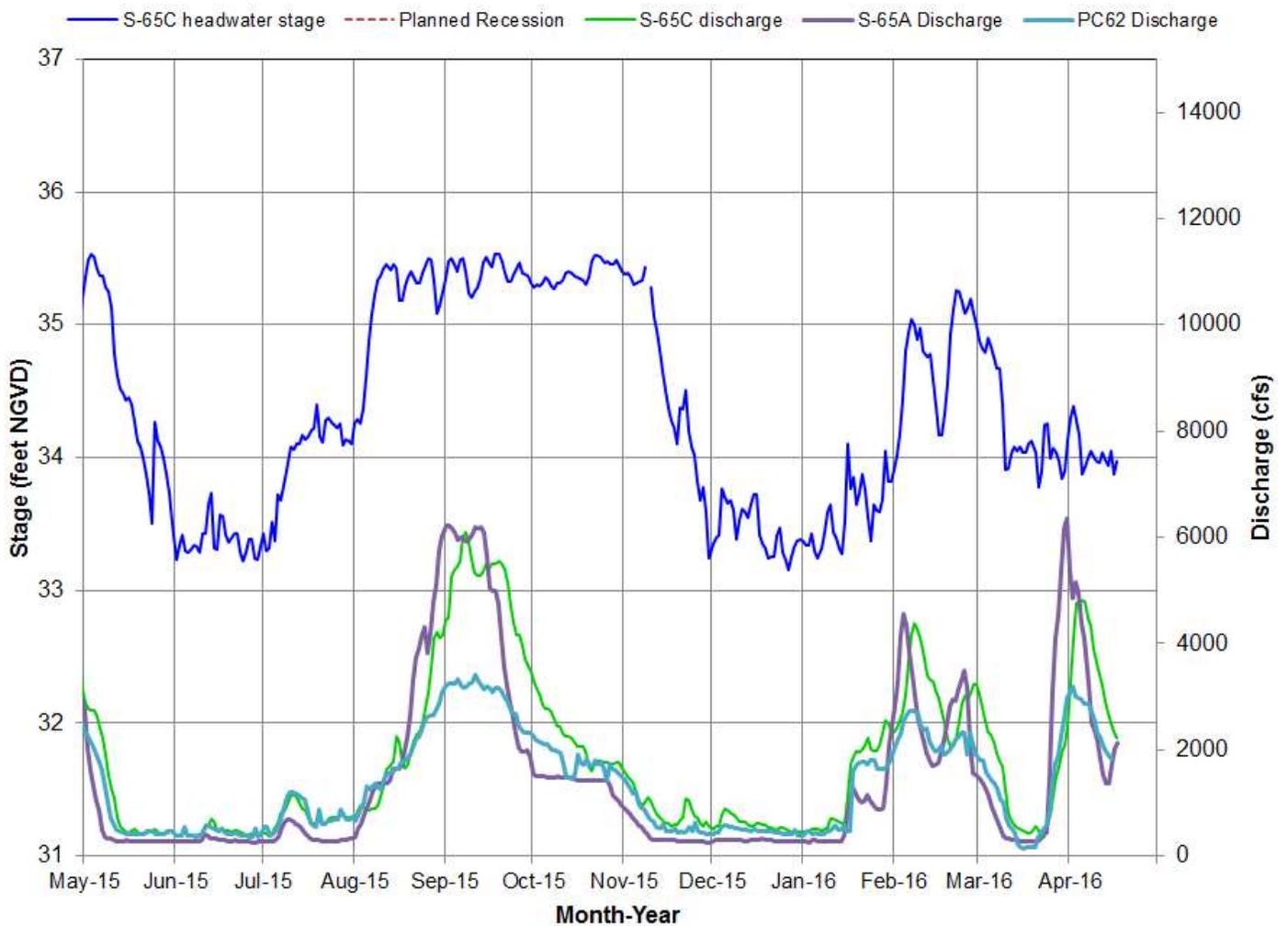


Figure 9. S-65C headwater stage in relation to discharge at S-65C, S-65A, and PC62.

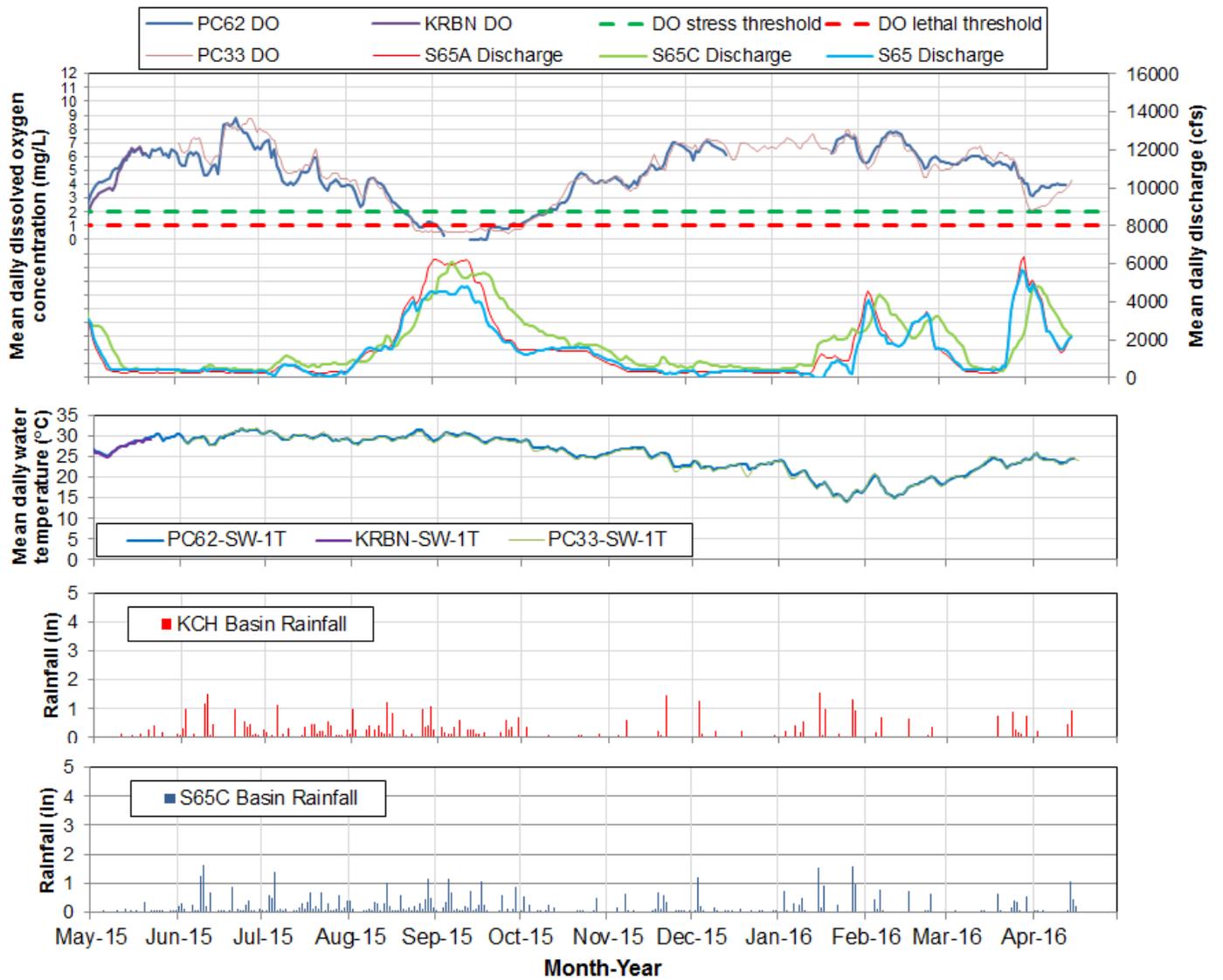


Figure 10. Mean daily Dissolved Oxygen, discharge, temperature and rainfall in the Phase I river channel.

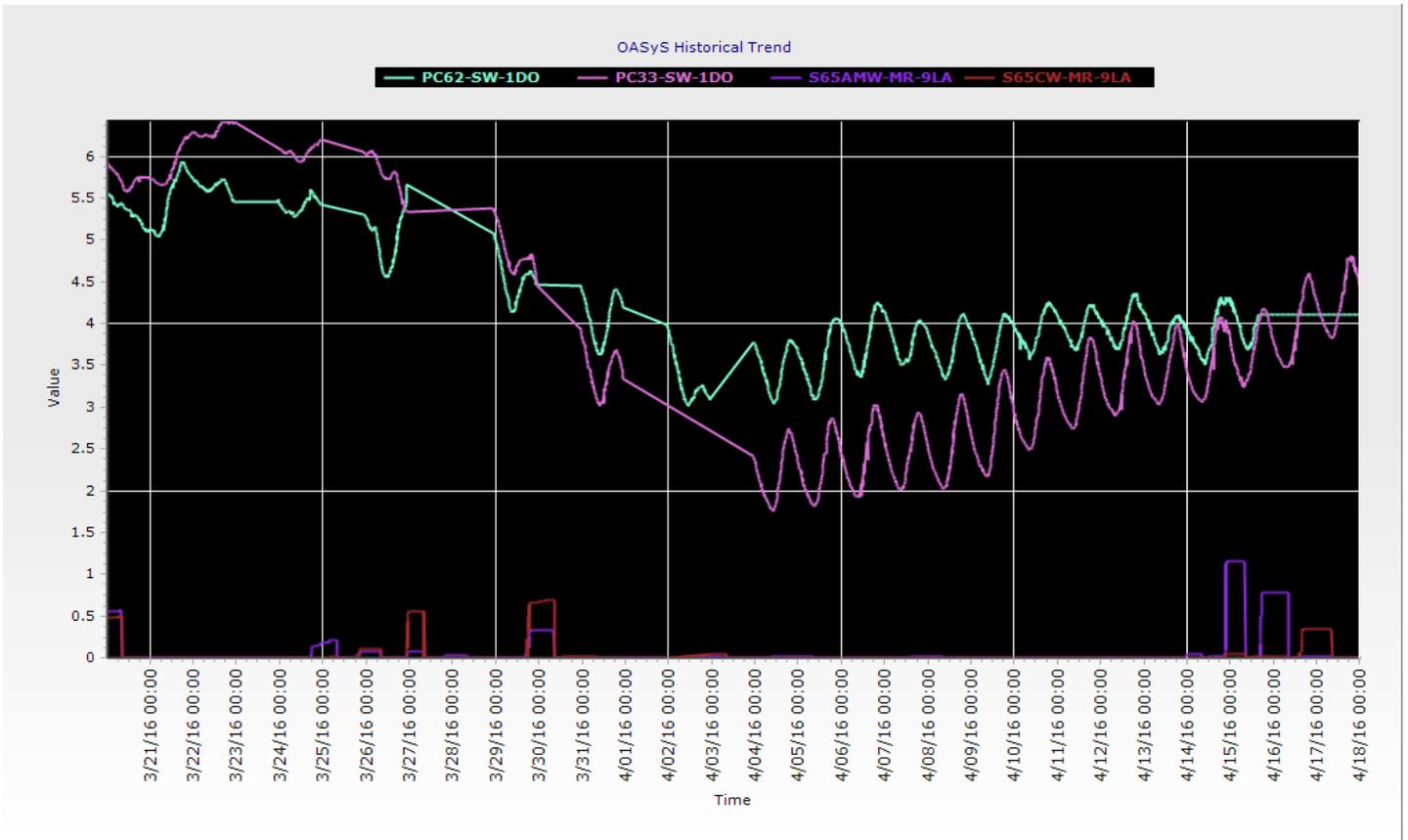


Figure 11. Phase I river channel dissolved oxygen (measured at 15 minute intervals) and rainfall at S65A and S65C.

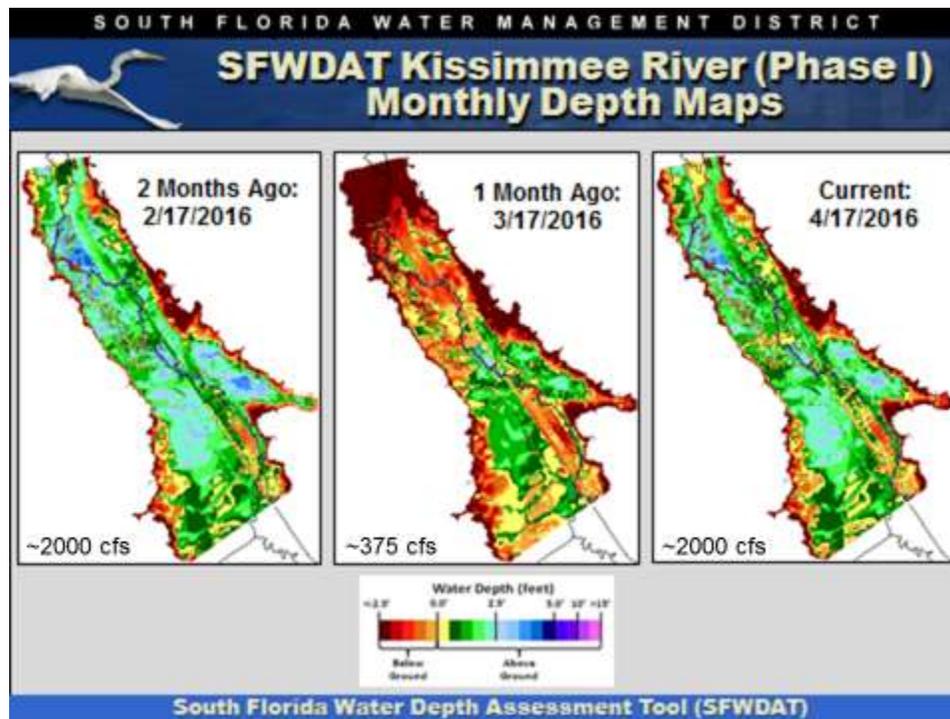


Figure 12. Phase I area floodplain water depths for this week, one month ago, and two months ago. Note that the WDAT color-coding has been modified to accommodate greater water depths; these maps are not directly comparable to Kissimmee Basin WDAT maps published prior to Jan. 16, 2012.

Kissimmee River Hydrographs

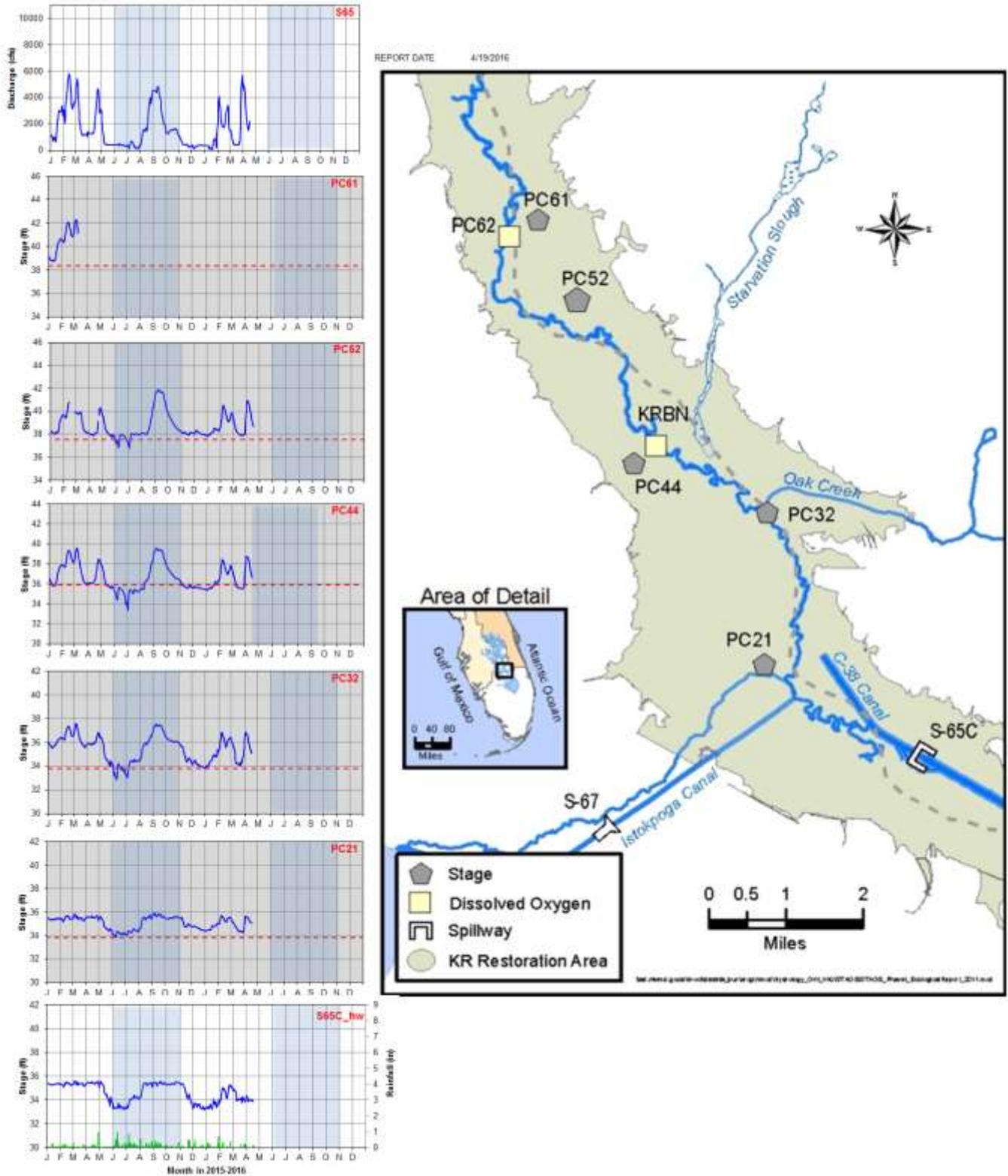


Figure 13. Discharge at S65, stages at five monitoring stations in the Phase I area of the Kissimmee River floodplain, and headwater stage at S65-C since January 1, 2015. The most recent data (~2 weeks) are provisional real-time data from SFWMD DualTrend; previous data are from SFWMD DB-HYDRO (validated). Dashed lines are ground elevations.

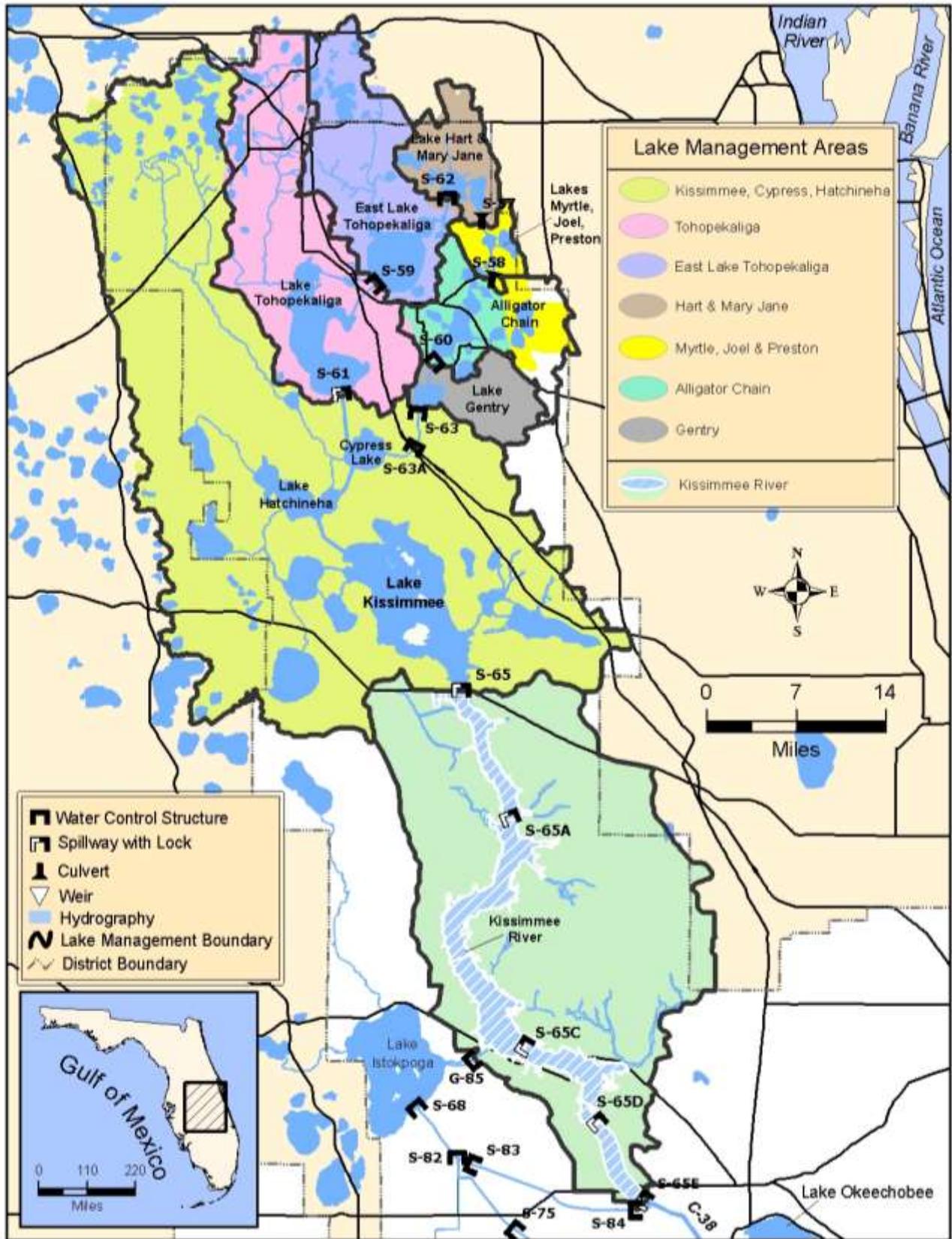


Figure 14. The Kissimmee Basin

LAKE OKEECHOBEE

According to the USACE web site, Lake Okeechobee stage is at 14.65 feet NGVD for the period ending at midnight on April 18, 2016. This value is based on the use of four interior Lake stations (L001, L005, L006, and LZ40) and four perimeter stations (S352, S4, S308 and S133). Lake stage has decreased by 0.20 feet over the past week and is 0.59 feet lower than it was a month ago and 0.95 feet higher than it was a year ago (Figure 1). The Lake is in the Low Flow Sub-band (Figure 2). According to RAINDAR, 0.67 inches of rain fell directly over the Lake during the past seven days. In most of the northern watershed, similar to a higher amount of rain fell, while slightly less rain fell in the remaining portions near the Lake. In the eastern watershed slightly lower to a slightly higher amount of rain fell and in the southern and western watersheds slightly less to less rain fell (Figure 3).

Based on USACE reported values, current Lake inflow is approximately 2,769 cfs, consisting of flows as indicated below.

Structure	Flow cfs
S65E	2,182
S154	0
S84 & 84X	506
S71	45
S72	36
C5(Nicodemus slough dispersed storage)	0
S191	0
S133 PUMPS	0
S127 PUMPS	0
S129 PUMPS	0
S131 PUMPS	0
S135 PUMPS	0
Fisheating Creek	-NR-
S2 Pumps	0
S3 Pumps	0
S4 Pumps	0

Current Lake outflow is approximately 5,551 cfs exiting at S77 (2,439 cfs), S308 (1,159 cfs), S351 (1,022 cfs), S352 (551 cfs), S354 (180 cfs) and to the L8 canal through Culvert C10A (200 cfs). Water supply demands have decreased somewhat in the EAA as less water moved south. Corrected evapotranspiration value based on the L006 weather platform solar radiation data for this past week was 3,300 cfs.

Change in elevation equivalents and average weekly flows for major structures are presented in Figure 4. Weekly average values for S77 and S308 are based on USGS data for the below structure gauges.

Based on the Lake Okeechobee wading bird habitat suitability index, there are currently approximately 55,228 acres of potentially suitable foraging habitat on the Lake for long-legged wading birds, and 21,729 acres of potentially suitable foraging habitat for short-legged wading birds (Figure 5). However, the April 14 wading bird survey identified only 1,218 birds foraging in the marsh (Figure 6).

The most recent MODIS satellite images (April 9 and 14) indicate both the absence and the potential for algal bloom conditions in the pelagic zone, although the April 14 image may be displaying a thin layer of clouds instead of potential algal bloom conditions (Figure 7).

Water Management Recommendations

The winter/spring dry season recession continued last week with a decrease of 0.20 feet. The Lake stage decrease reflects a larger decrease in inflows compared to the decrease in outflows. Future short-term recommendations will depend in large measure on the near-term rainfall patterns and amounts. Actions which contribute to continuing the recession are essential to protect critical components of the Lake's floral (bulrush and submerged aquatic vegetation) and faunal (wading birds, snail kites and fish) communities. Although it would require an average recession rate of 0.36 feet per week to achieve the desired Lake stage of approximately 12.5 feet NGVD by the end of the dry season, this recession rate is probably too fast for snail kites, wading birds and apple snails and therefore ecologically inadvisable. However, it is important to maintain a steady recession in Lake levels and avoid additional reversals.

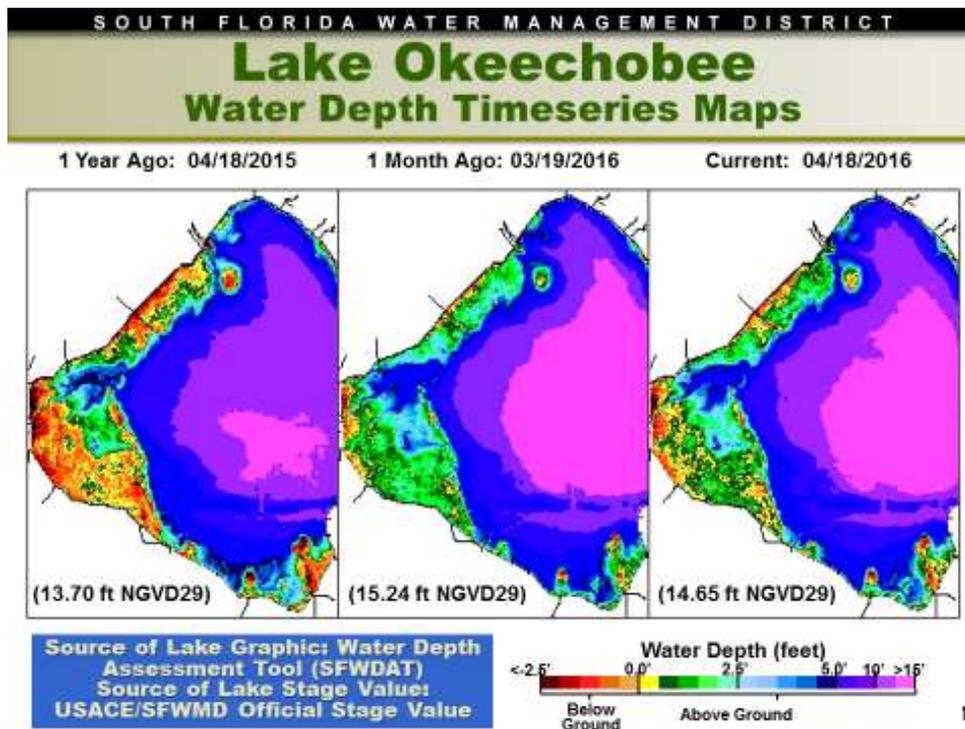


Figure 1

Lake Okeechobee Water Level History and Projected Stages

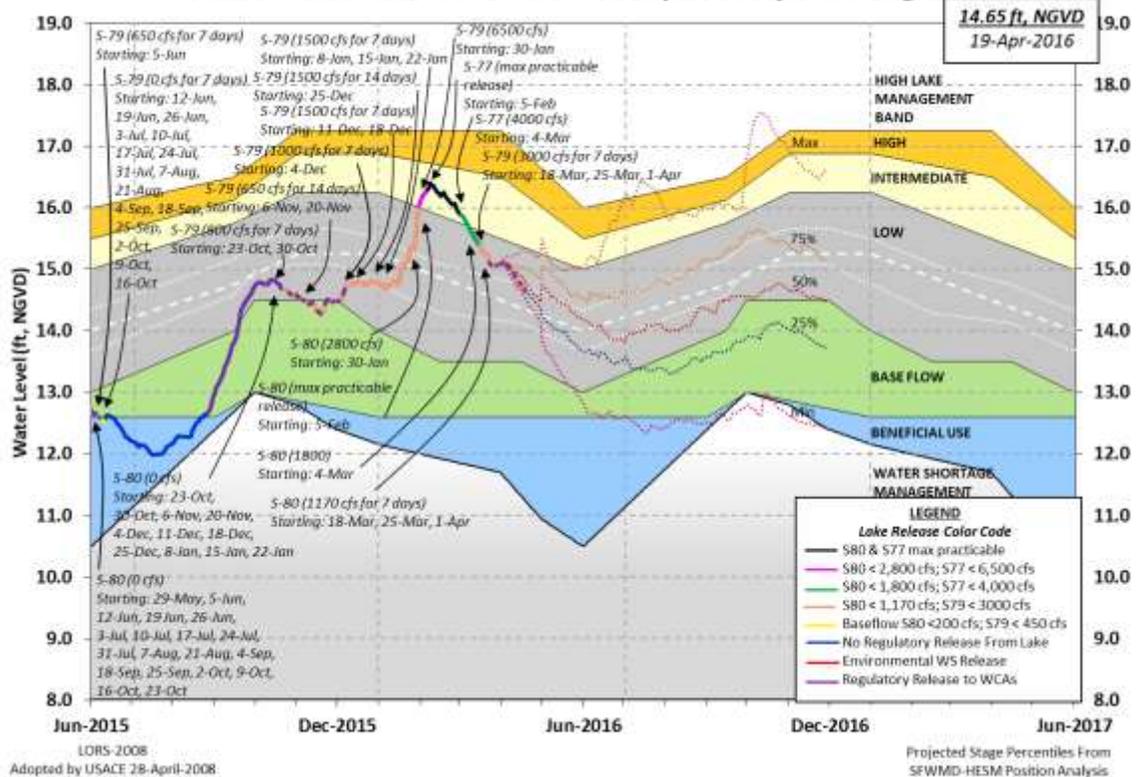
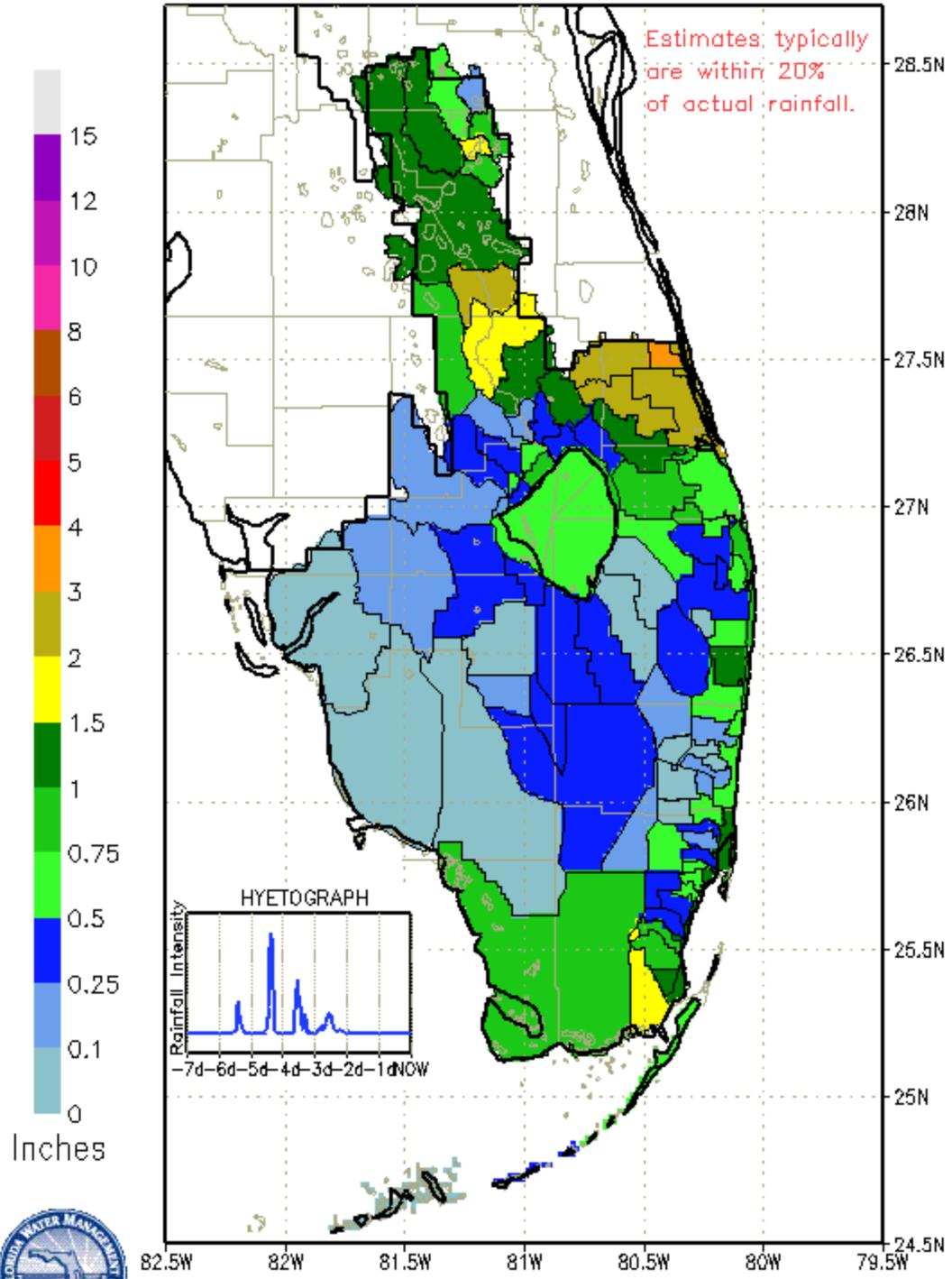


Figure 2

SFWMD PROVISIONAL RAINFAR 7-DAY BASIN RAINFALL ESTIMATES

FROM: 0515 EST, 04/12/2016 THROUGH: 0515 EST, 04/19/2016



DISTRICT-WIDE RAINFALL ESTIMATE: 0.591"

Figure 3

INFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S65E	2558	0.086
S71 & 72	72	0.002
S84 & 84X	316	0.011
Fisheating Creek	56	0.002
Rainfall	N.A.	0.056
OUTFLOWS	Average Daily Flow Past Week cfs	Feet of Change Past Week
S77	2809	0.094
S308	981	0.033
S351	767	0.026
S352	490	0.016
S354	831	0.028
L8	228	0.008
ET	3300	0.110

Figure 4

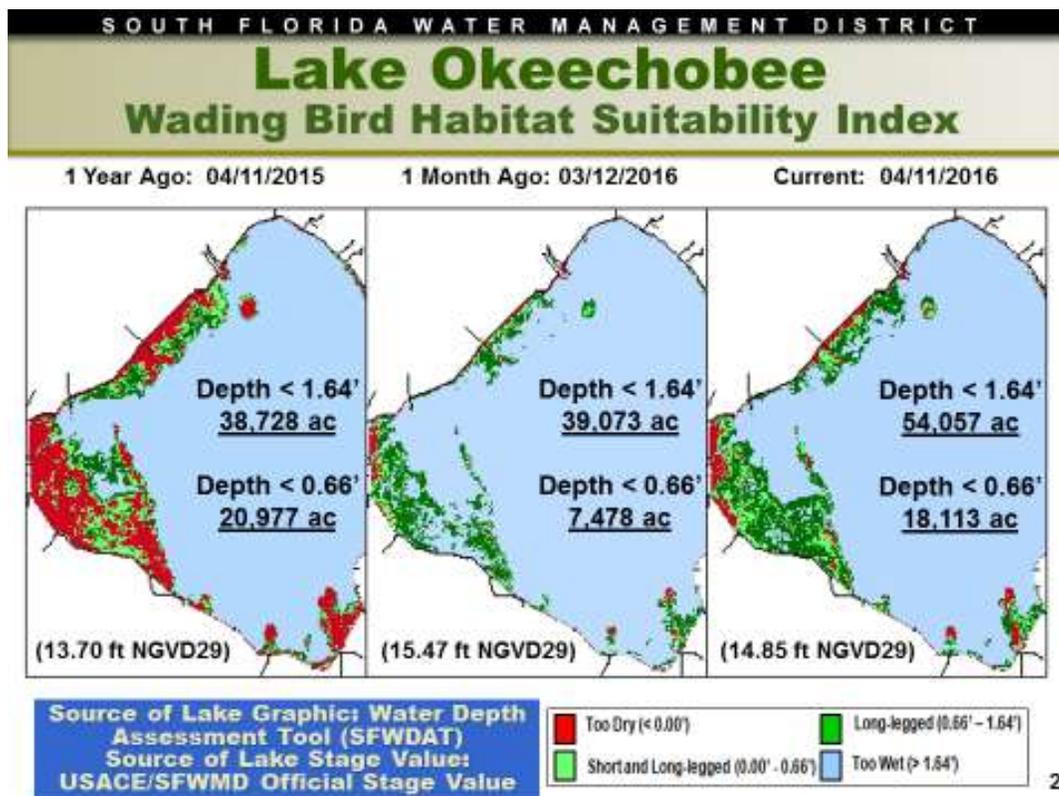


Figure 5

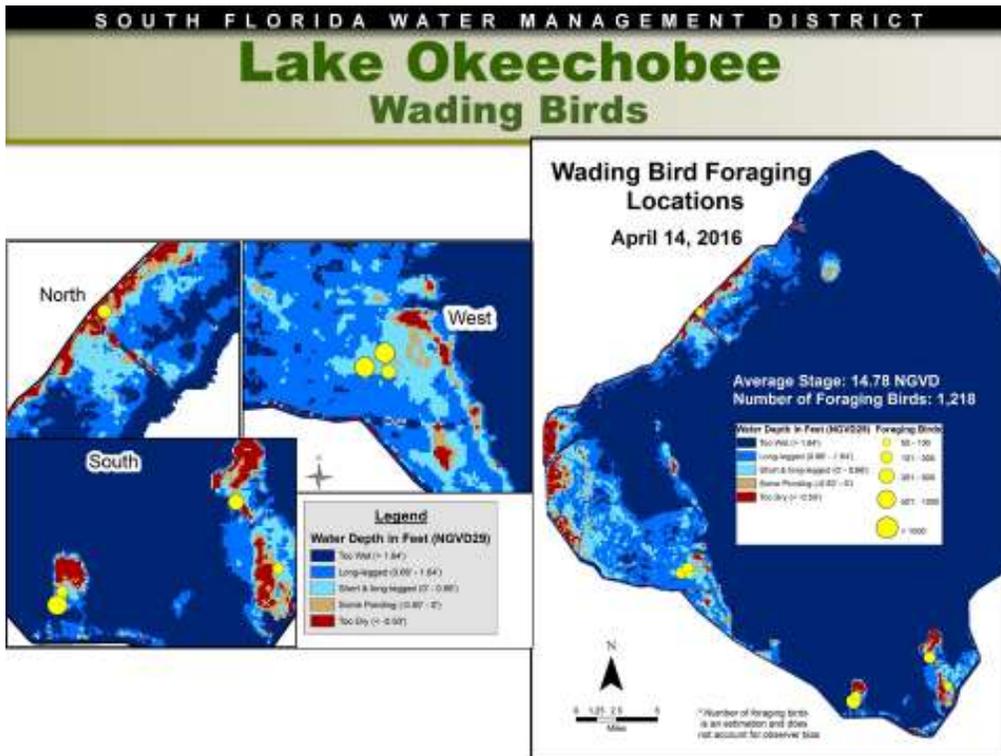


Figure 6

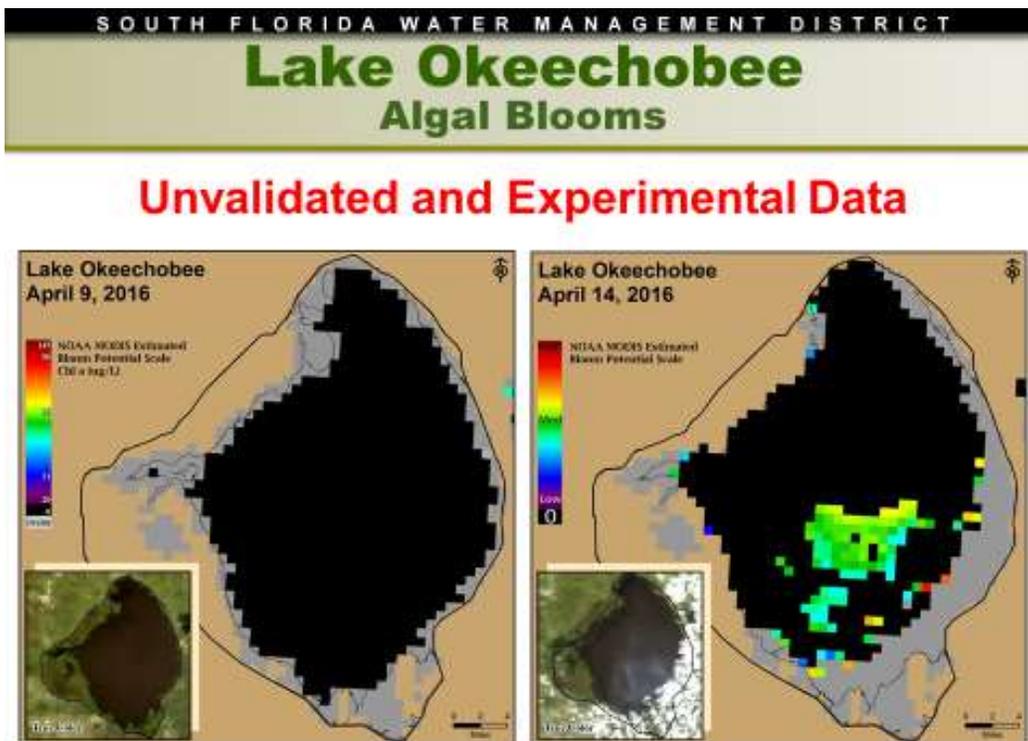


Figure 7

Lake Istokpoga

The annual recession from high pool to low pool stage on Lake Istokpoga is underway. Stage is 39.08 feet NGVD today and is currently 0.07 feet below its regulation schedule of 39.15 feet NGVD (Figure 8). Average flows into the Lake from Arbuckle and Josephine creeks were 94 and 23 cfs respectively, a decrease from the preceding week. Average discharge from S68 and S68X this past week was 376 cfs, a significant increase compared to the preceding week. According to RAINDAR, 0.80 inches of rain fell in the Lake Istokpoga watershed during the past seven days.

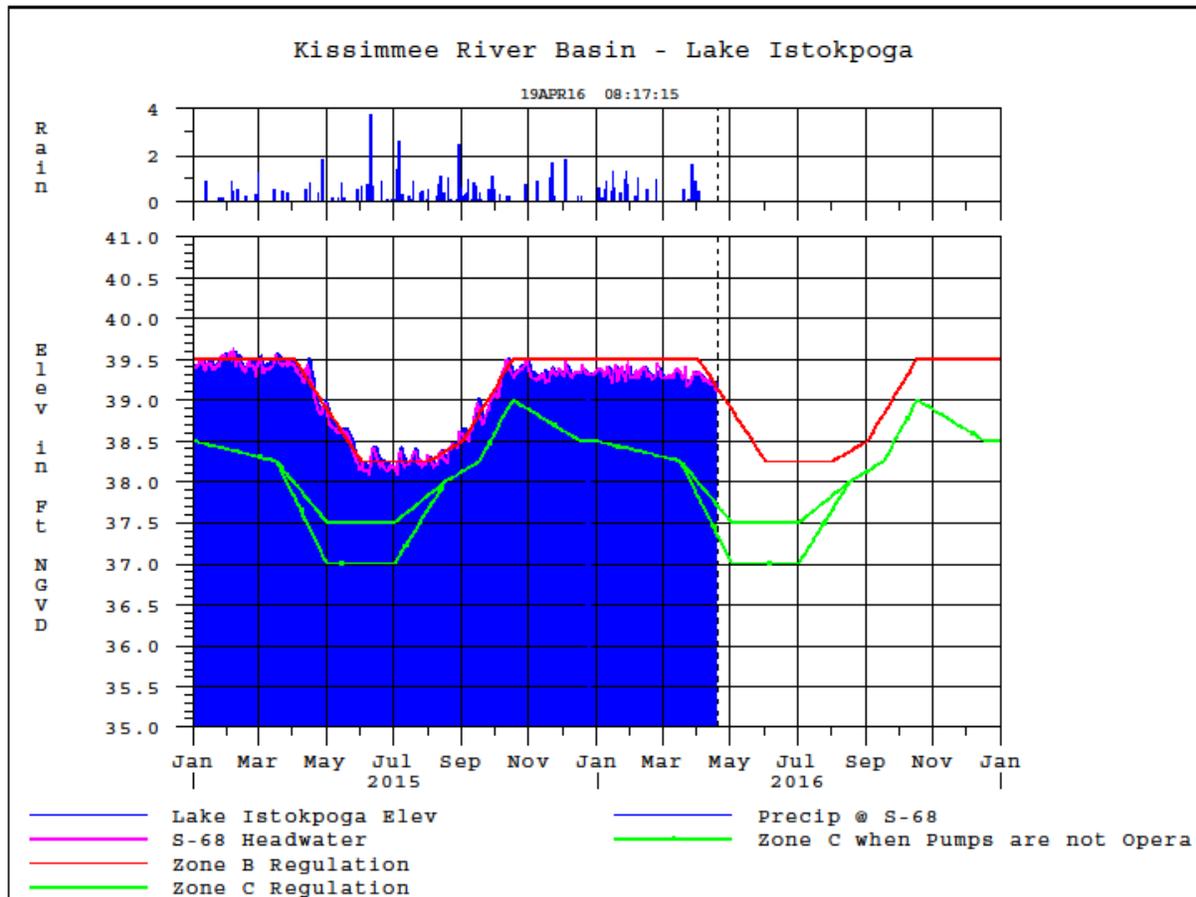


Figure 8

ESTUARIES

St. Lucie Estuary

Over the past week, provisional flows averaged 1,179 cfs at S-80, 981 cfs downstream of S-308, 227 cfs at S-49 on C-24, 56 cfs at S-97 on C-23, and 125 cfs from Ten Mile Creek at the Gordy Road Structure. Average inflow from tidal basin tributaries is estimated to be 353 cfs (Figures 1 and 2). Total inflow averaged about 1,940 cfs last week and 1,896 cfs over last month.

Over the past week, salinity increased throughout the estuary (Table 1, Figures 3 and 4). The seven-day moving average salinity of the water column at the US1 Bridge is about 8.7. Salinity conditions in the middle estuary are in the fair range for the adult eastern oyster.

Table 1. Seven-day average salinity at three monitoring stations in the St. Lucie Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for adult eastern oysters (*Crassostrea virginica*) in the middle estuary.

Sampling Site	Surface	Bottom	Envelope
HR1 (N. Fork)	5.2 (3.7)	6.4 (6.5)	NA ¹
US1 Bridge	7.3 (6.7)	10.1 (9.1)	10.0-26.0
A1A Bridge	17.9 (NR ²)	25.7 (24.0)	NA

¹Envelope not applicable, ²Not Reporting

Caloosahatchee Estuary

During the past week, provisional flows averaged approximately 2,809 cfs downstream of S-77, 2,362 cfs at S-78, and 2,943 cfs at S-79. Average inflow from tidal basin tributaries is estimated to be 115 cfs (Figures 5 and 6). Total inflow averaged 3,058 cfs last week and 3,146 cfs over last month.

Over the past week, surface salinity remained about fresh in the upper estuary from S-79 to Ft. Myers Yacht Basin, decreased at Cape Coral and Shell Point, and then increased at Sanibel (Table 2, Figures 7 & 8). The seven-day average salinity values are within the good range for adult oysters at Shell Point and at Sanibel and in the fair range at Cape Coral (Figure 9). The 30-day moving average surface salinity is 0.2 at Val I-75 and 0.3 at Ft. Myers. Salinity conditions at Val I-75 are in the good range for tape grass, and are forecasted to remain so in following two weeks even without discharges at S-79 (Figure 10).

Table 2. Seven-day average salinity at six monitoring stations in the Caloosahatchee Estuary. Current average is in bold face type, previous average in parentheses. The envelope reflects the preferred salinity range for tape grass (*Vallisneria americana*) at Val I-75 and for adult eastern oysters (*Crassostrea virginica*) elsewhere.

Sampling Site	Surface	Bottom	Envelope
S-79 (Franklin Lock)	0.2 (0.2)	0.2 (0.2)	NA ¹
Val I75	0.2 (0.2*)	0.3* (0.2*)	0.0-5.0 ²
Ft. Myers Yacht Basin	0.5 (0.2)	0.7 (0.3)	NA
Cape Coral	4.8 (5.0)	8.4* (6.4*)	10.0-30.0
Shell Point	18.8 (19.6)	21.5 (21.3)	10.0-30.0
Sanibel	27.9 (26.4)	29.1 (27.6)	10.0-30.0

¹Envelope not applicable, ²Envelope is based on a 30-day average.

Val I75 is temporarily offline due to bridge construction and Cape Coral well for bottom sensor damaged;

*Salinity values are estimated using models developed for these sites.

Monitoring data collected by the River, Estuary and Coastal Observing Network of Sanibel-Captiva Conservation Foundation using continuous sensors are summarized in Table 3 as concentration ranges of Chlorophyll *a* and dissolved oxygen at Beautiful Island, Ft. Myers, and Shell Point in the Caloosahatchee Estuary.

Table 3. Weekly ranges of Chlorophyll *a* (a measure of algal biomass) and dissolved oxygen concentrations at three monitoring stations maintained by the Sanibel-Captiva Conservation Foundation.

	RECON Monitoring Stations		
	Beautiful Island	Ft. Myers	Shell Point
Chlorophyll <i>a</i> (µg/l)	4.1 – 5.4	2.7 – 8.0	2.2 – 6.5
Dissolved Oxygen (mg/l)	5.9 – 7.5	6.2 – 9.8	5.4 – 7.4

The Florida Fish and Wildlife Research Institute reported on April 15, 2016, that *Karenia brevis*, the Florida red tide organism, was present in background concentrations in one sample collected from Lee County.

Water Management Recommendations

Given the current estuarine conditions, there are no ecological benefits associated with releases from Lake Okeechobee.

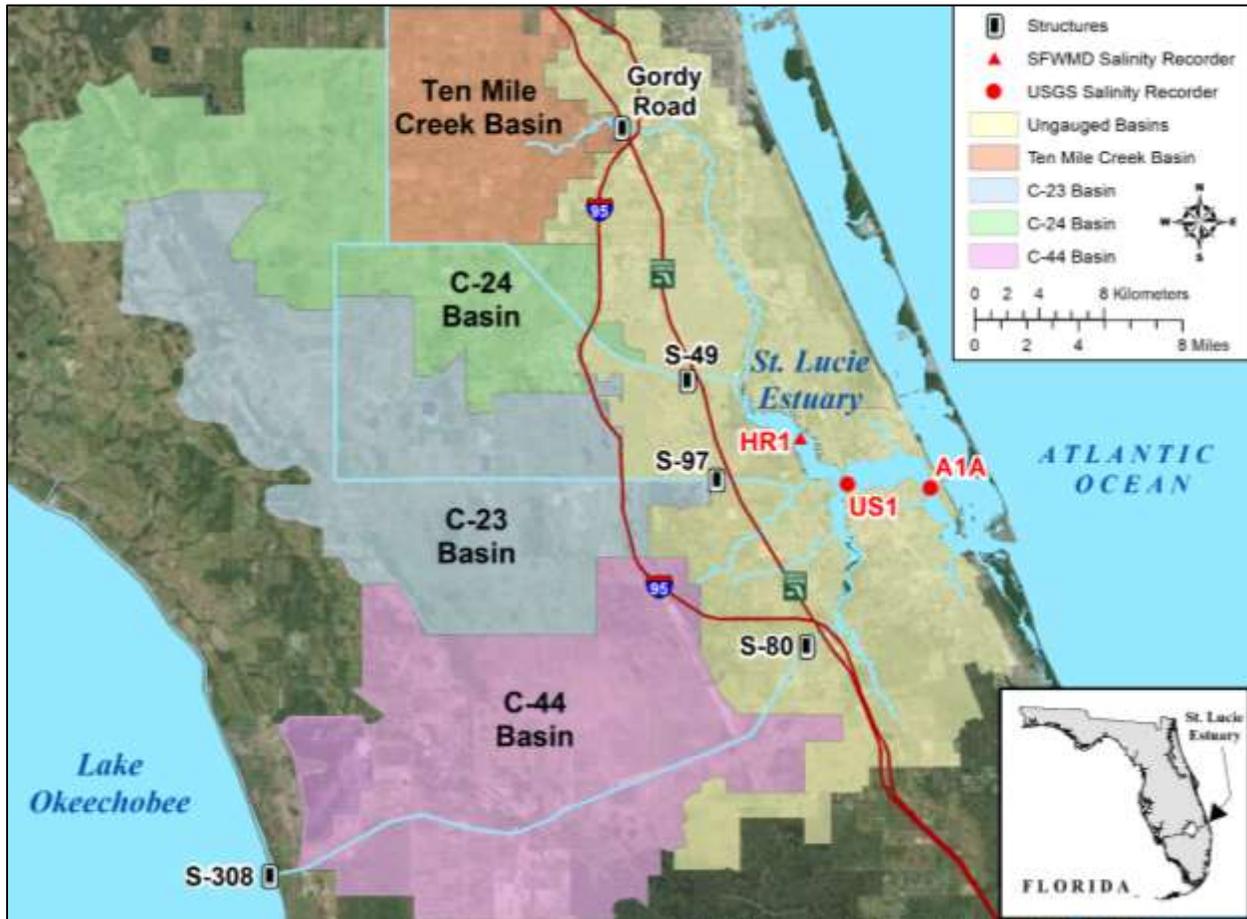


Figure 1. Basins, water control structures, and salinity monitoring for the St. Lucie Estuary.

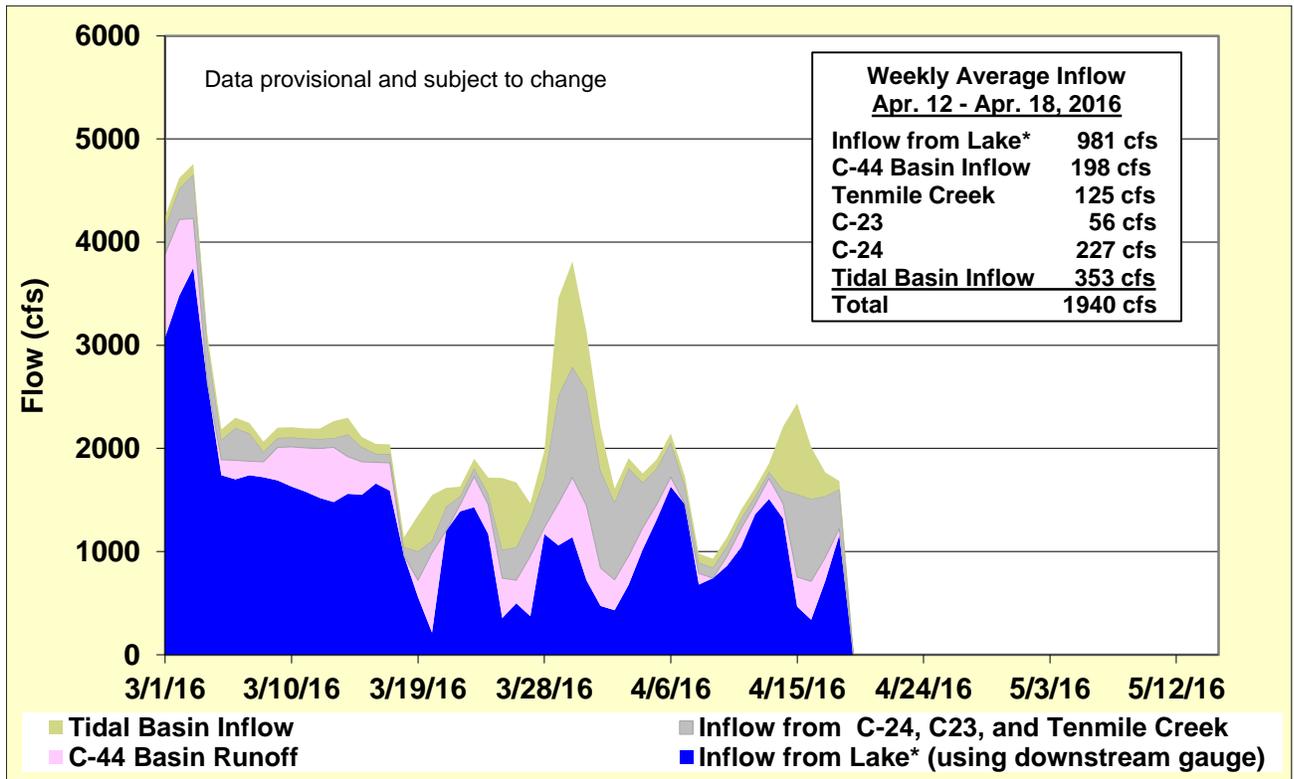


Figure 2. Estimated surface freshwater inflows from Lake Okeechobee and runoff from the C-44, C-23, C-24, Ten Mile Creek, and tidal basins into the St. Lucie Estuary.

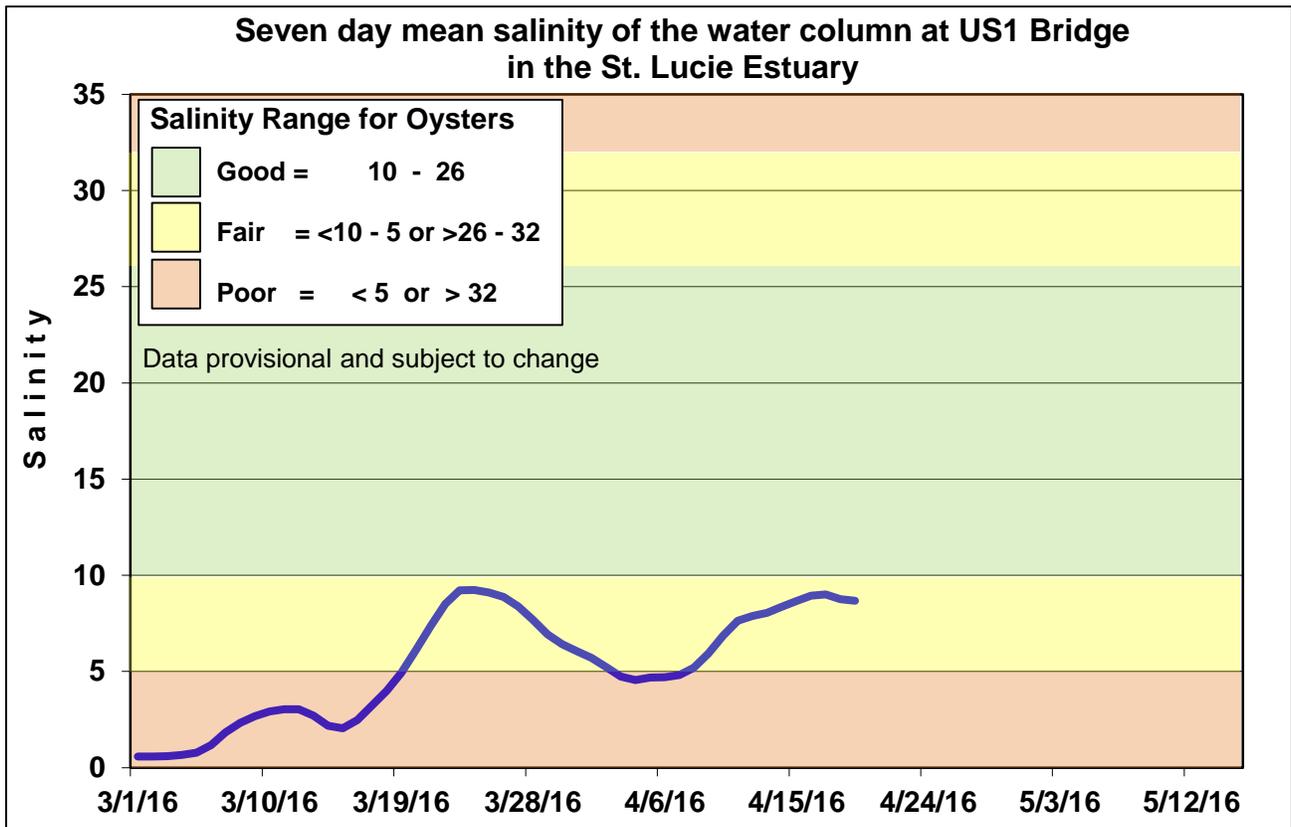


Figure 3. Seven-day mean salinity of the water column at the U.S. Highway 1 Bridge.

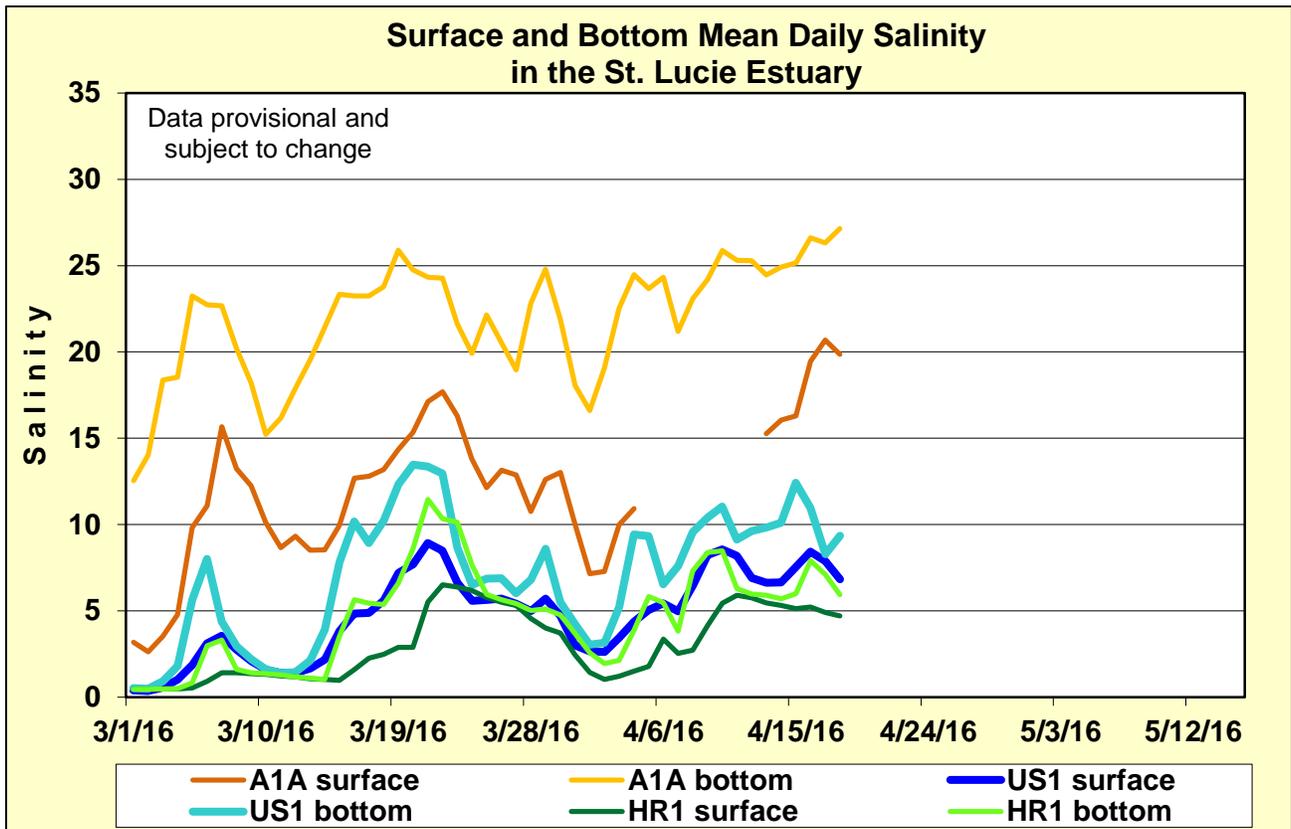


Figure 4. Daily mean salinity at the A1A, US1 and estimated HR1 stations.

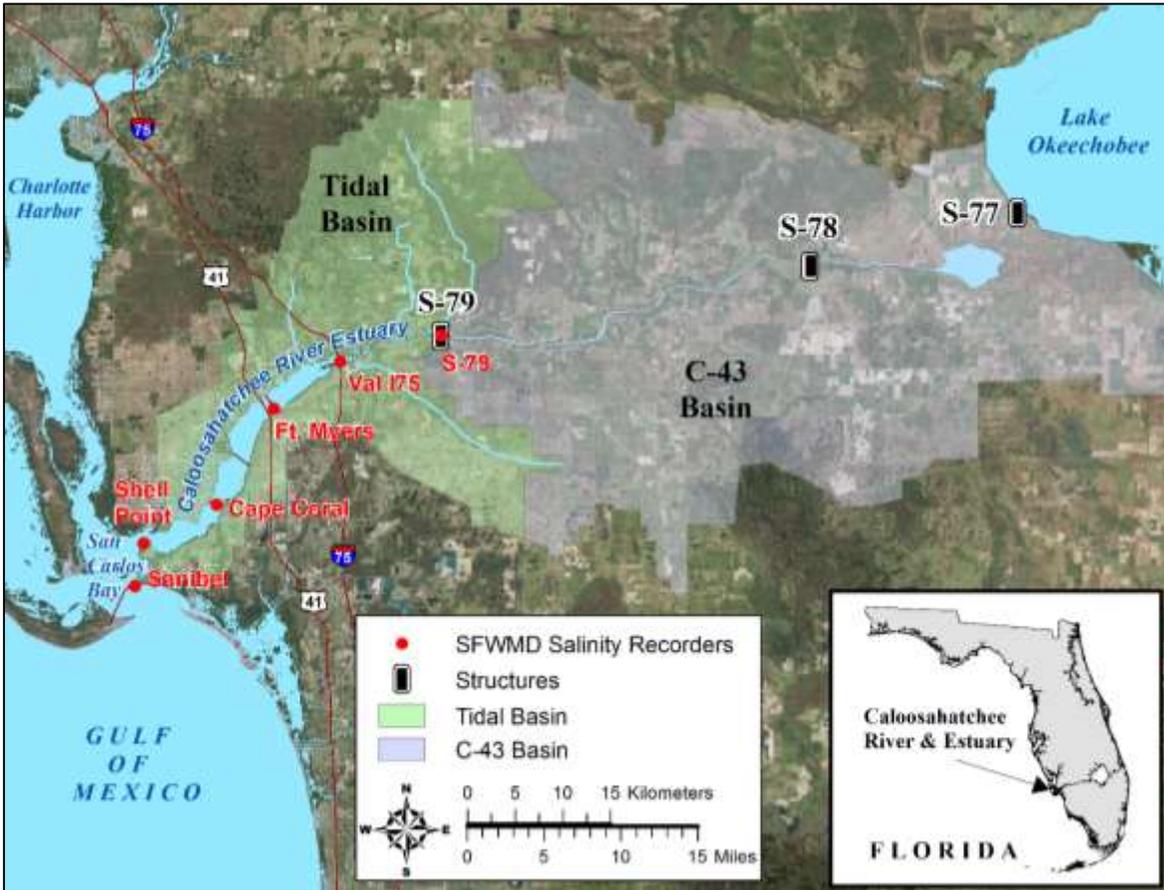


Figure 5. Basins, water control structures, and salinity monitoring for the Caloosahatchee Estuary.

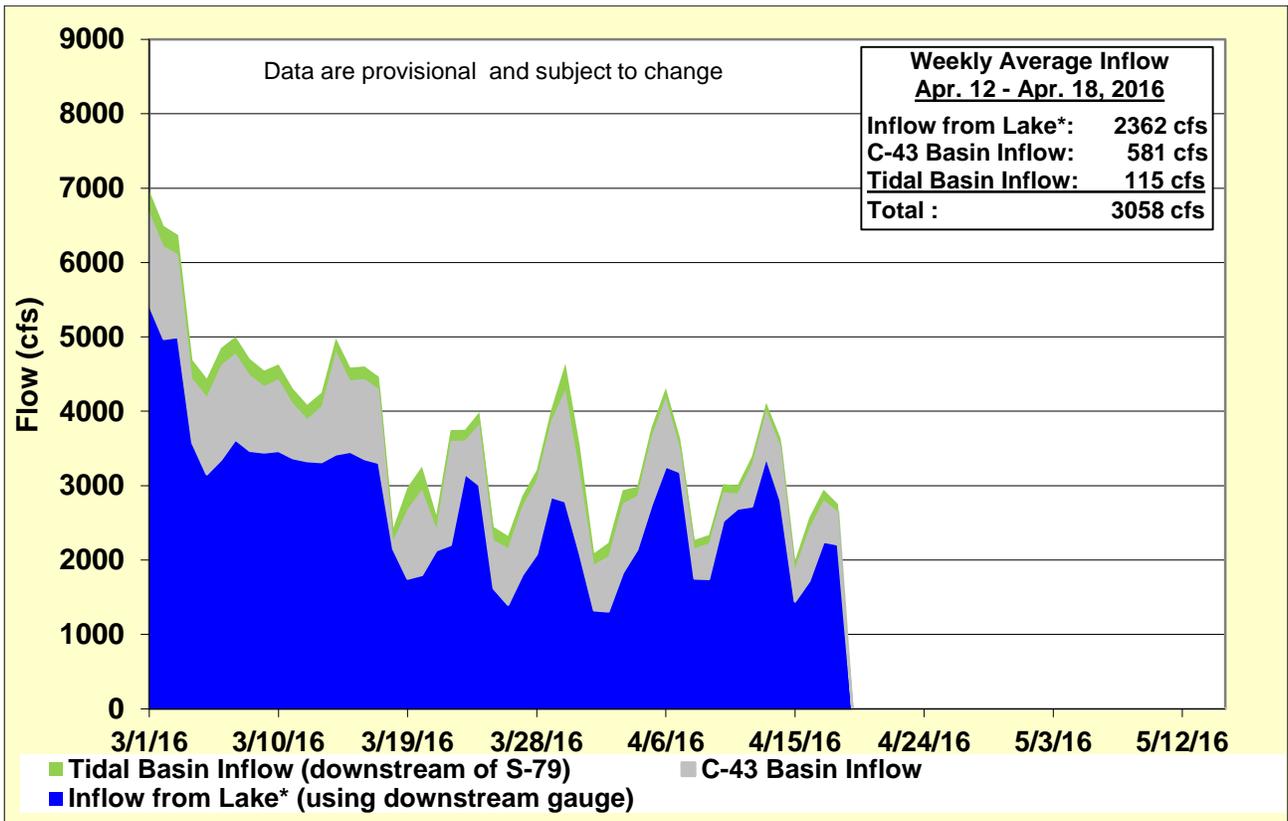
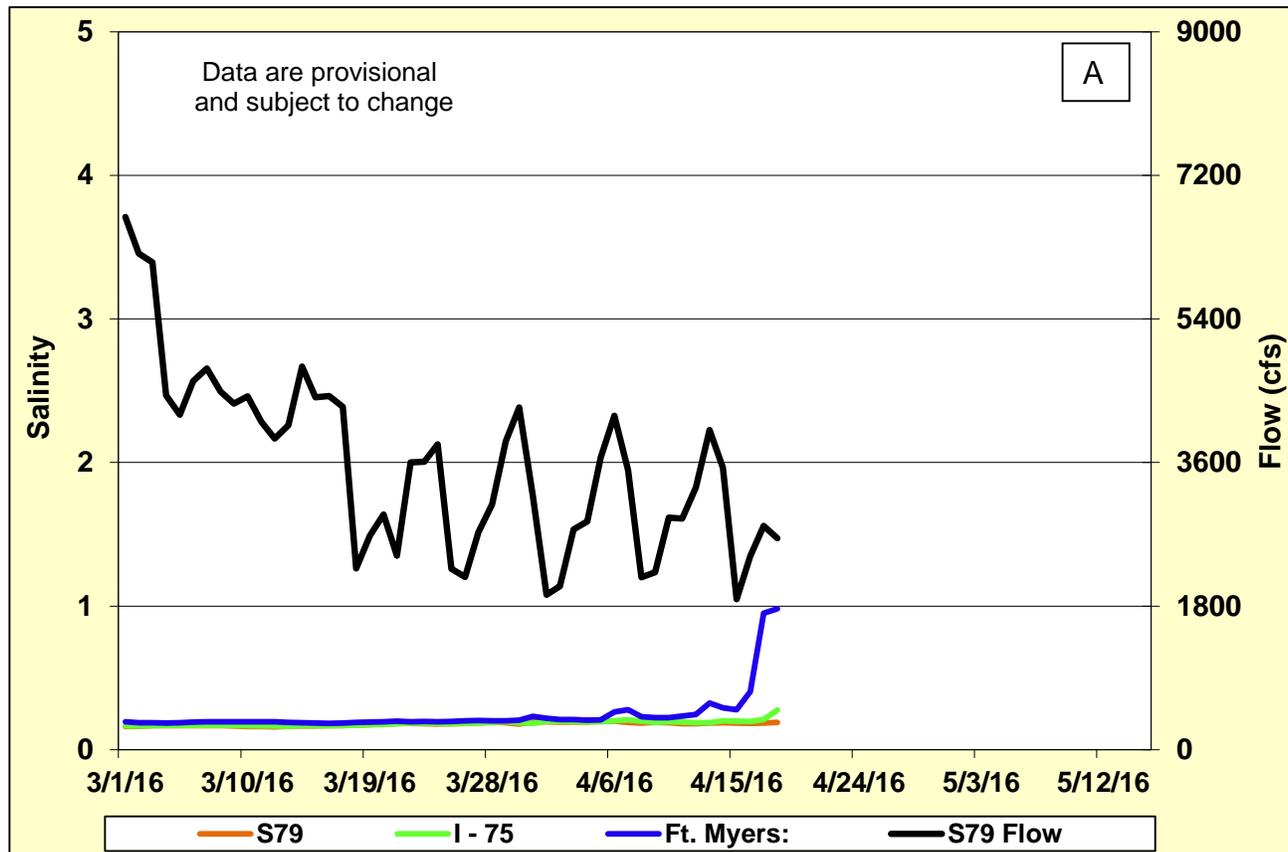


Figure 6. Freshwater inflows from Lake Okeechobee, runoff from the C-43 basin, and tributaries in the tidal basin into the Caloosahatchee River Estuary.



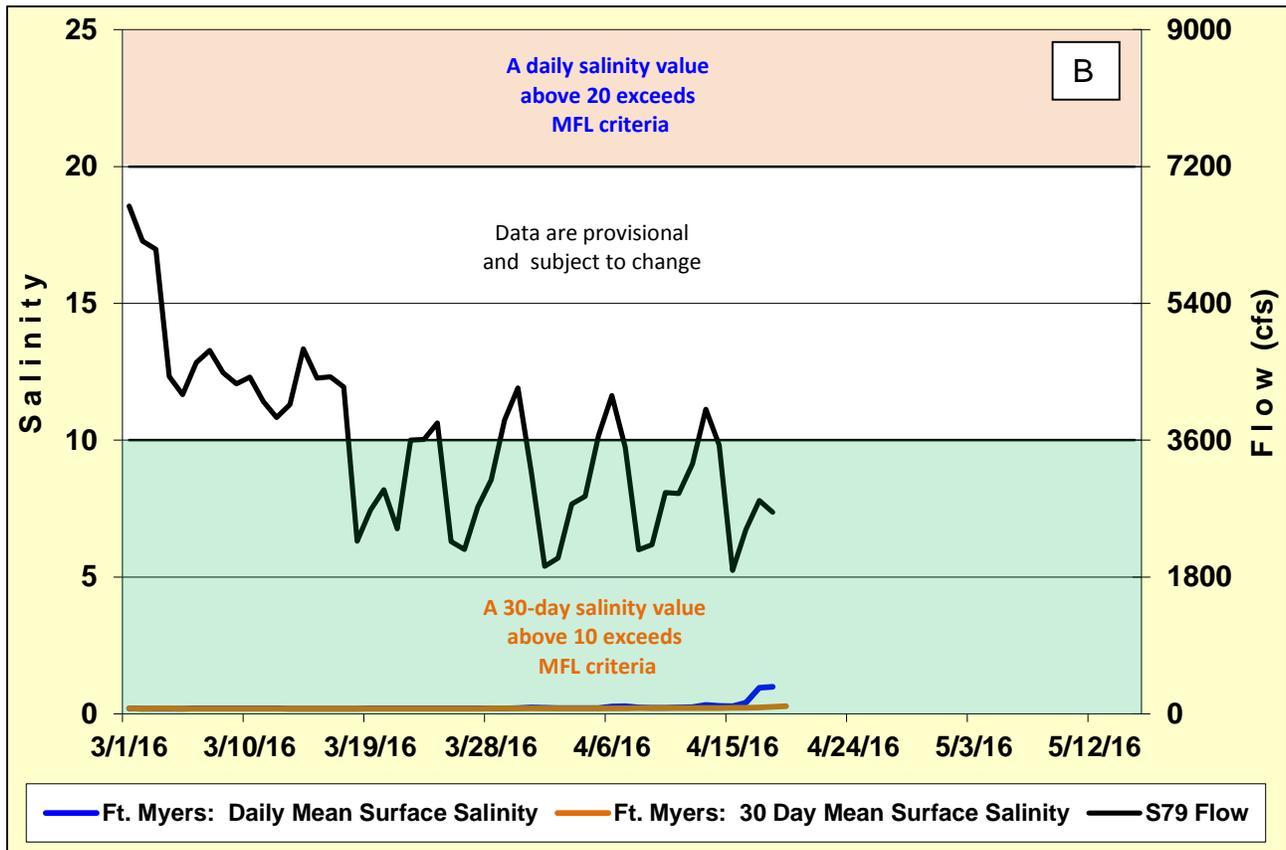


Figure 7. Daily mean flows at S-79 and salinity at upper estuary monitoring stations (A) and 30-day moving average salinity at Ft. Myers (B).

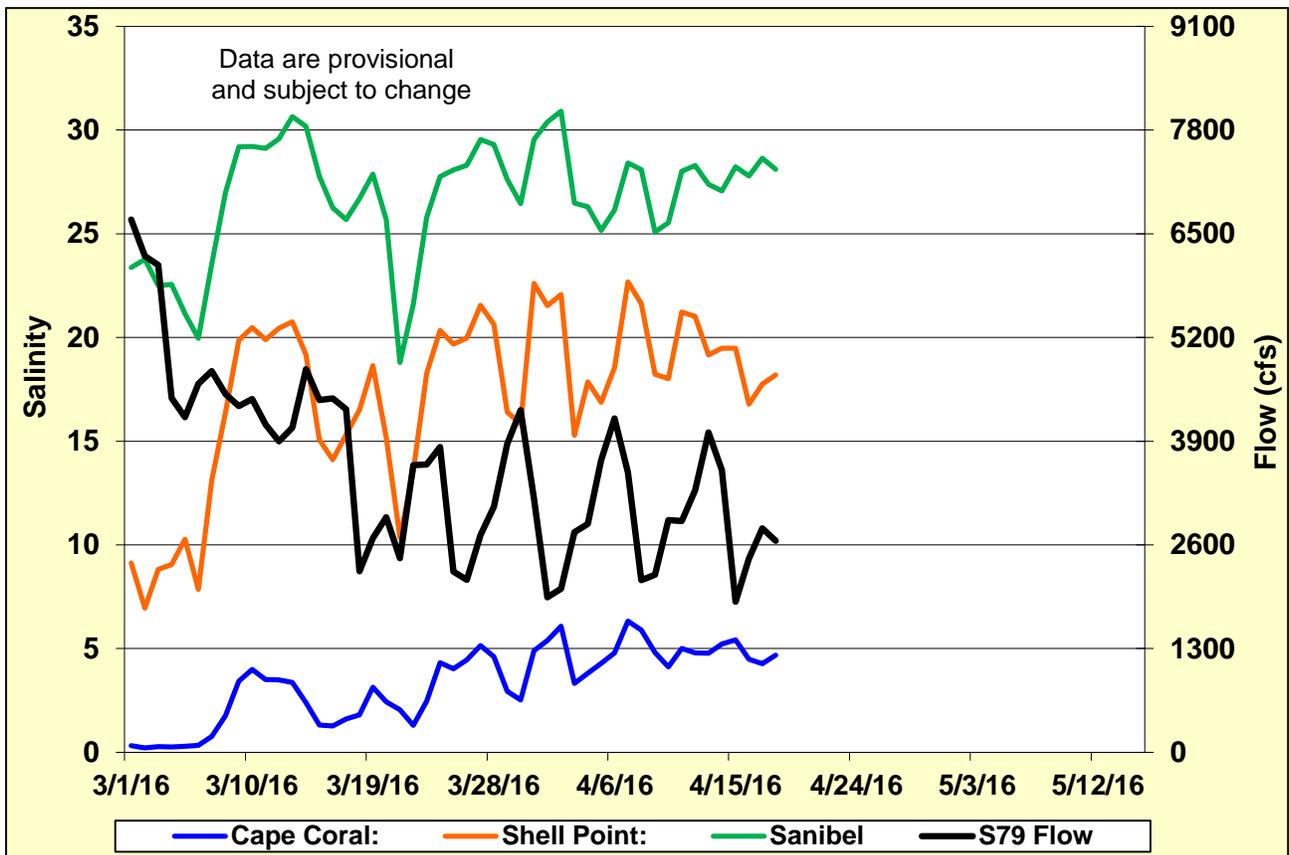


Figure 8. Daily mean flows at S-79 and salinity at lower estuary stations.

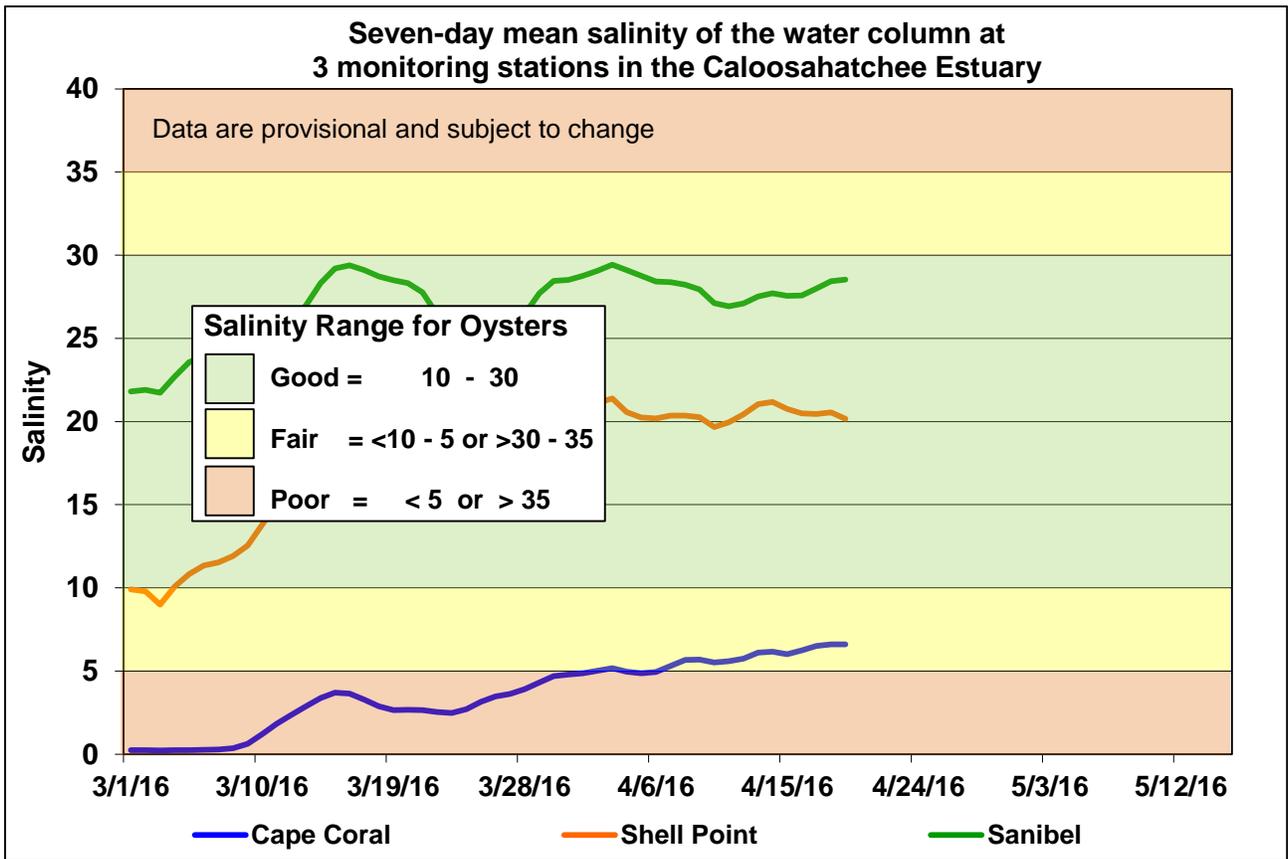


Figure 9. Seven-day mean salinity at Cape Coral Bridge, Shell Point and Sanibel Bridge monitoring stations.

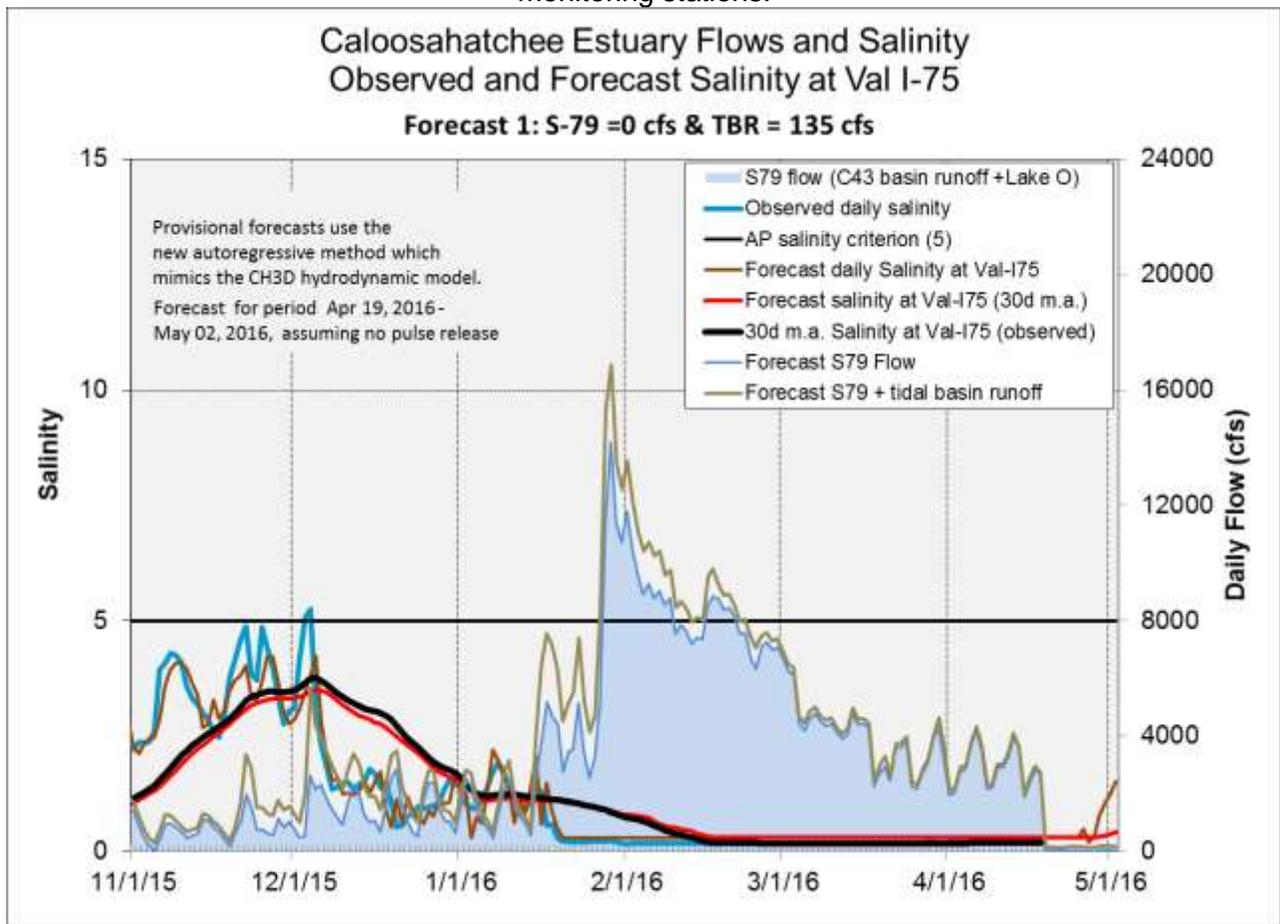


Figure 10. 14-day salinity forecast at Val I-75 assuming no releases at S-79.

GREATER EVERGLADES

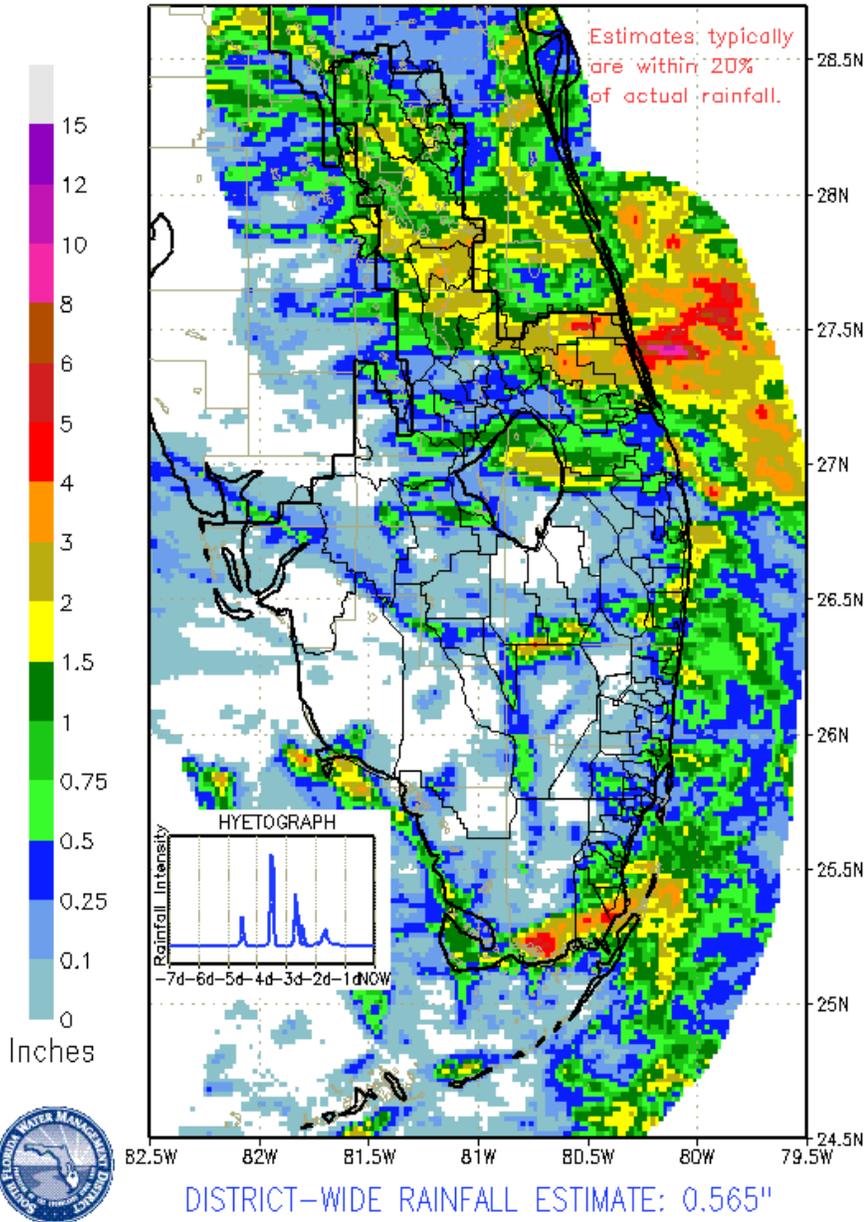
Rainfall was low again last week in most of the Everglades, but southern Everglades National Park (ENP) and the C-111 basin experienced a high local maximum of 5.26 inches. Everglades stages decreased from -0.03 feet to -0.23 feet. Pan evaporation was 1.74 inches, above the pre-project average of 1.54 inches.

Everglades Region	Rainfall (Inches)	Stage Change (feet)
WCA-1	0.39	-0.07
WCA-2A	0.18	-0.11
WCA-2B	0.01	-0.13
WCA-3A	0.24	-0.23
WCA-3B	0.07	-0.13
ENP	0.52	-0.03

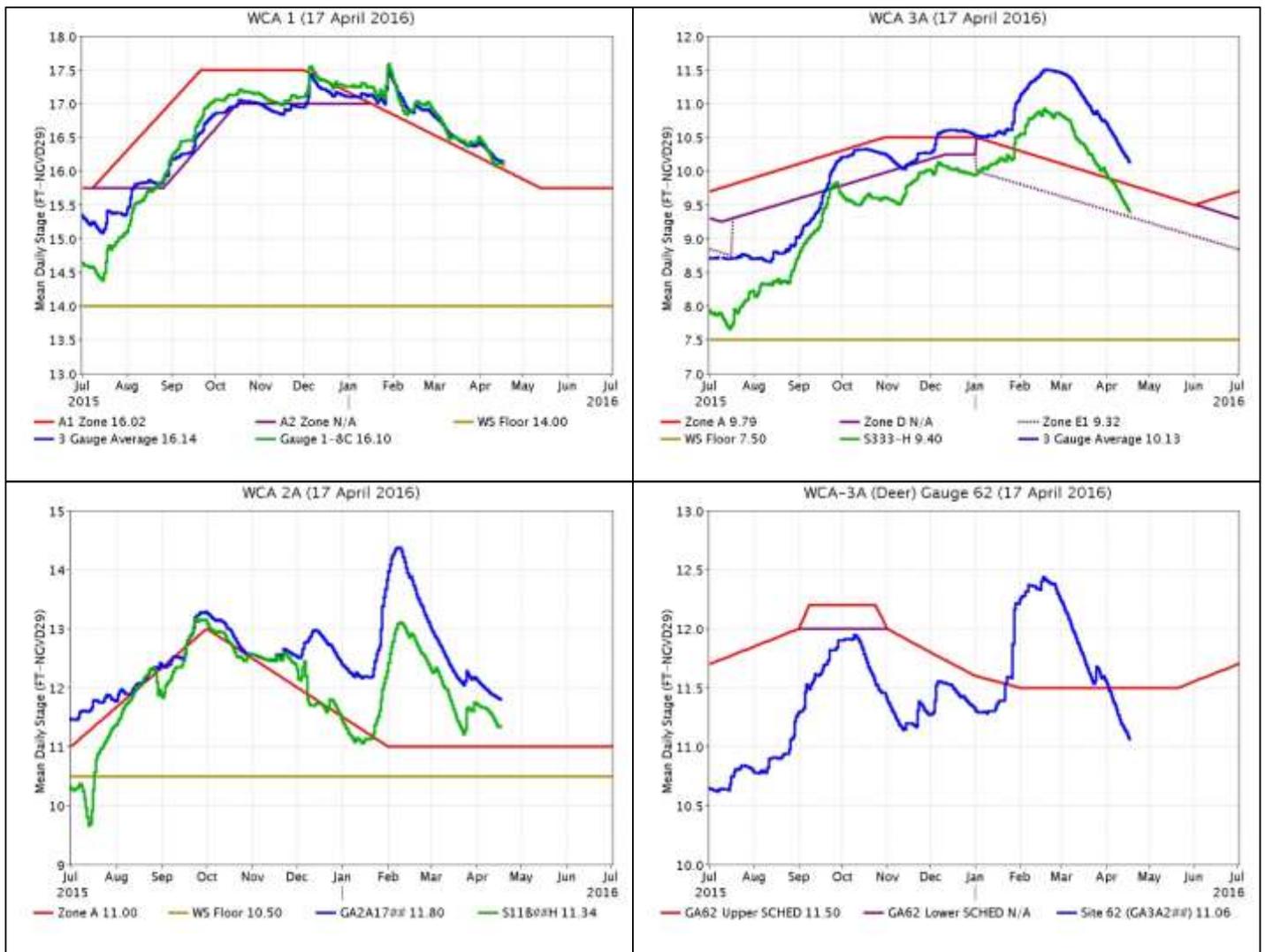
	Good
	Fair
	Poor

SFWMD PROVISIONAL RAINDAR 7-DAY RAINFALL ESTIMATES

FROM: 0815 EST, 04/11/2016 THROUGH: 0815 EST, 04/18/2016



Regulation Schedules: Stages decreased again with the low rainfall last week. The WCA-1 stage difference from regulation decreased to 0.12 feet. The WCA-2A stage fell to 0.80 feet above regulation, and the three-gauge average stage in WCA-3A declined to 0.34 feet above regulation. The northwestern WCA-3A gauge stage (gauge 62) has decreased to -0.44 feet below the upper schedule, but is still almost a foot above ground.

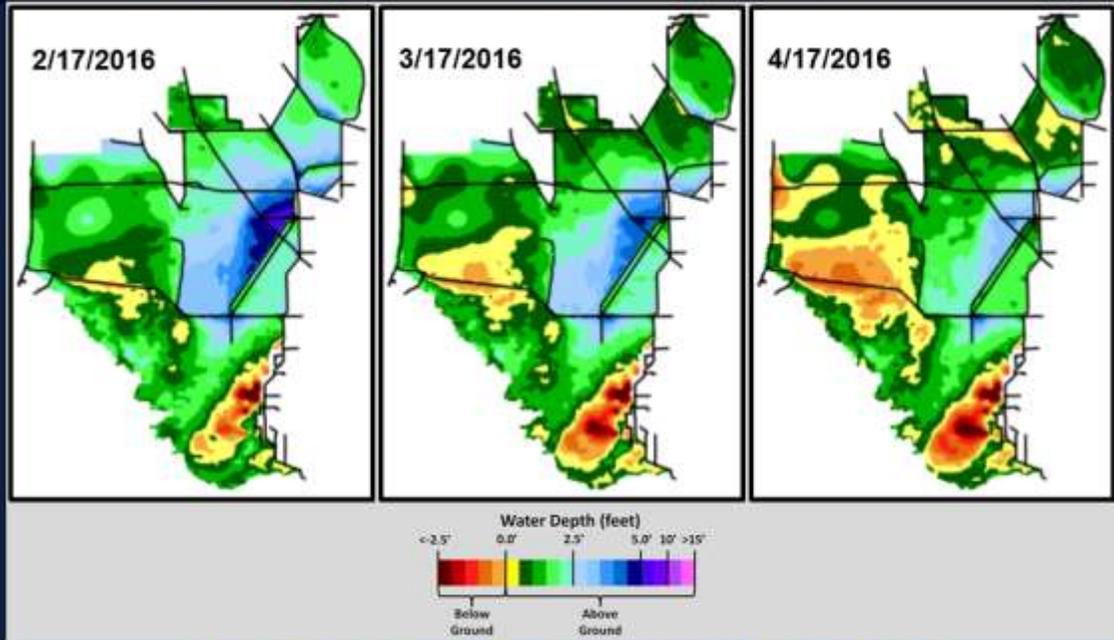


Water Depths and Changes: Water levels continue to decrease and are substantially lower than they were one and two months ago. Water depths at the monitored gauges (except WCA-2B) range from 0.86 feet to 2.35 feet. Depths at gauge 65 are now below 2.5 feet, the depth of note for tree island inundation-duration (now 2.35 feet). Depths at gauges 63 and 64 (northern and central WCA-3A) are both well below two feet.

Stages declined almost everywhere last week. Water depths are a half foot to one foot lower than a month ago. Relative to a year ago, stages are a half to 2.5 feet or more higher this year. Stages at individual gauges declined -0.27 feet to -0.03 feet last week.



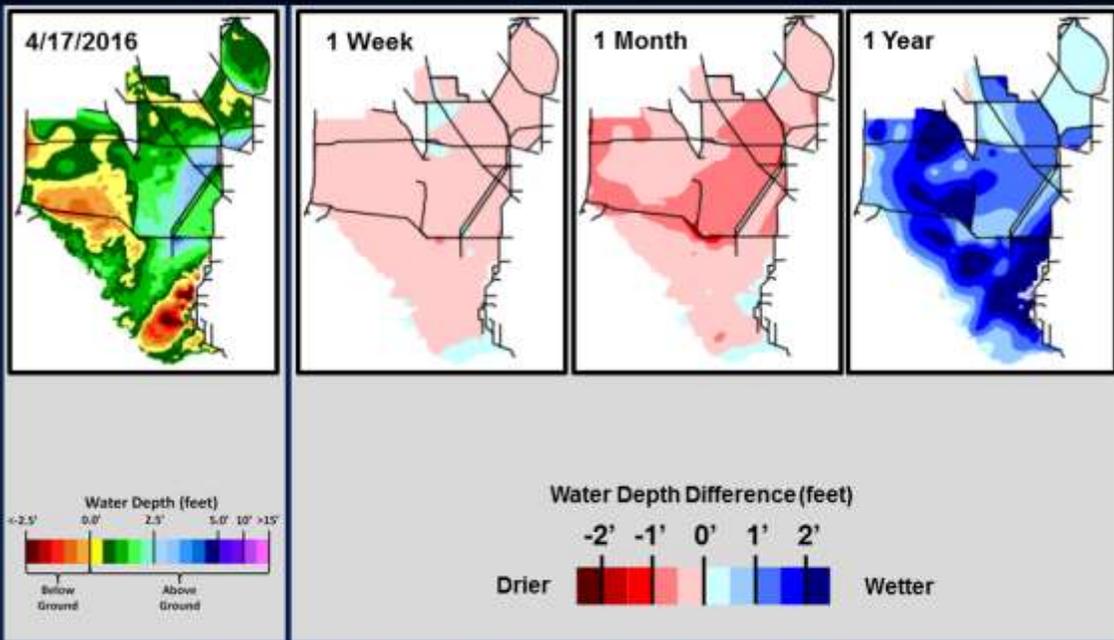
SFWDAT Water Depth Monthly Snapshots



South Florida Water Depth Assessment Tool (SFWDAT)

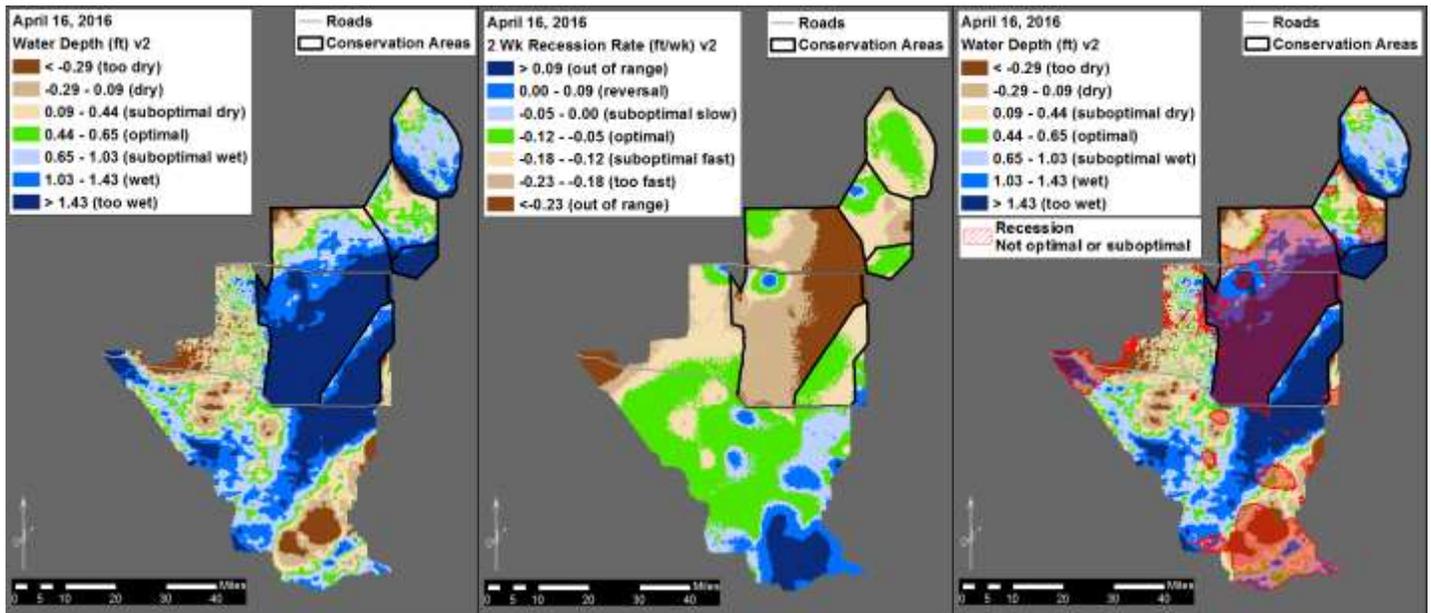


SFWDAT Everglades Difference Maps (Present - Past)



South Florida Water Depth Assessment Tool (SFWDAT)

Areas with suitable foraging depths (0.09 feet to 1.03 feet) have expanded but do not yet correspond with suitable recession rates except in WCAs 1 and 2A.

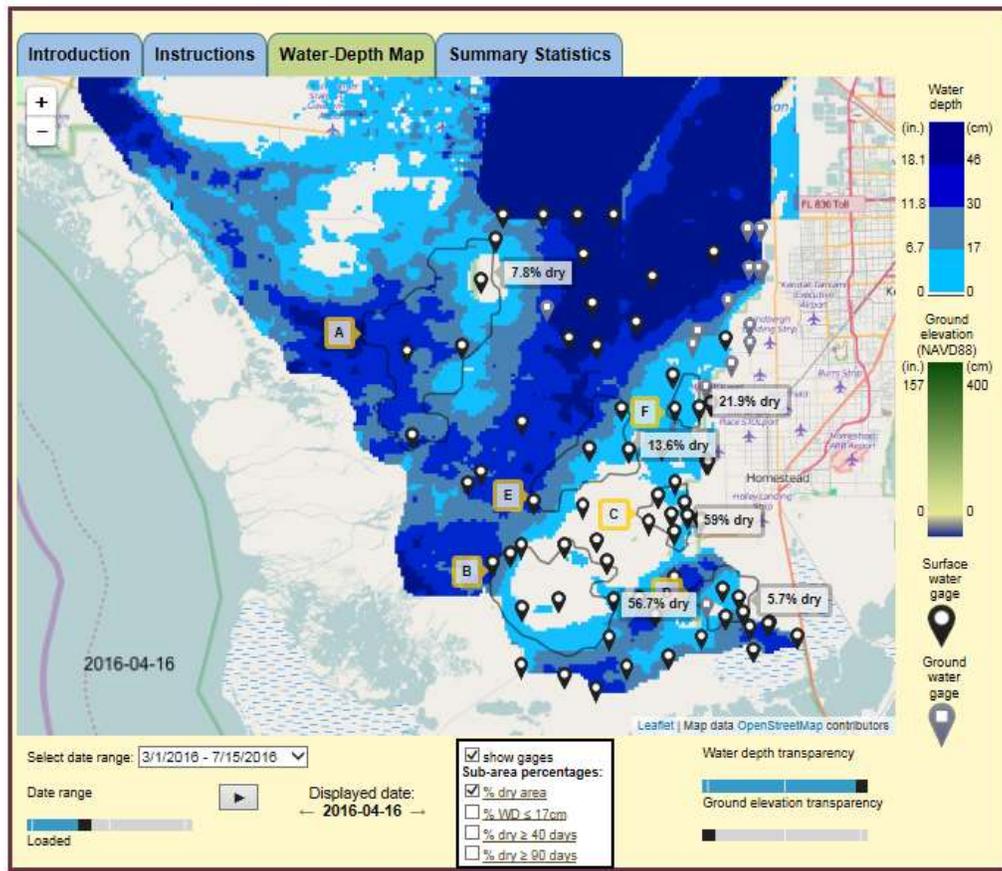


Wading birds and wildlife:

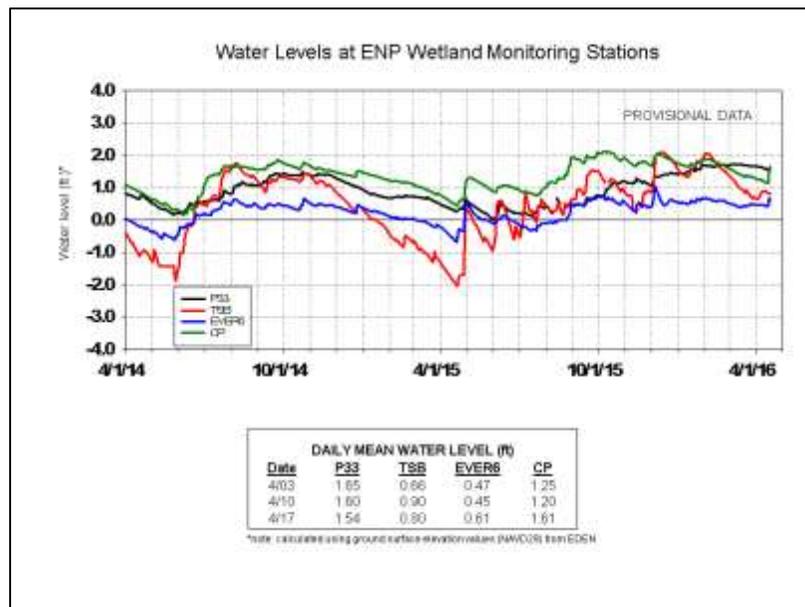
Foraging: Foraging conditions are favorable in northern WCA-1 and northern WCA-2A but few birds are foraging even in areas considered optimal. The District's WCA-2A research plots, CHIP and AMI, are supporting several thousand foraging birds. Water in WCA-3A remains too deep for foraging.

Nesting: A large white ibis colony in southwestern WCA-1 (Colony 99) has 6,000 to 7,000 nests. Other than there, nesting numbers are very low for all species in April, when nesting is usually the highest. No new information is available for Snail kites, wood storks, or terrestrial wildlife.

Cape Sable Seaside Sparrow: Water levels in the subpopulations have declined since last week and dry areas are expanding. Subpopulations B and C are over 55 percent dry. While conditions have been poor for early season breeding, improving conditions suggest that May to June may provide late season breeding opportunities. Surveys have started and there are signs of breeding activity.



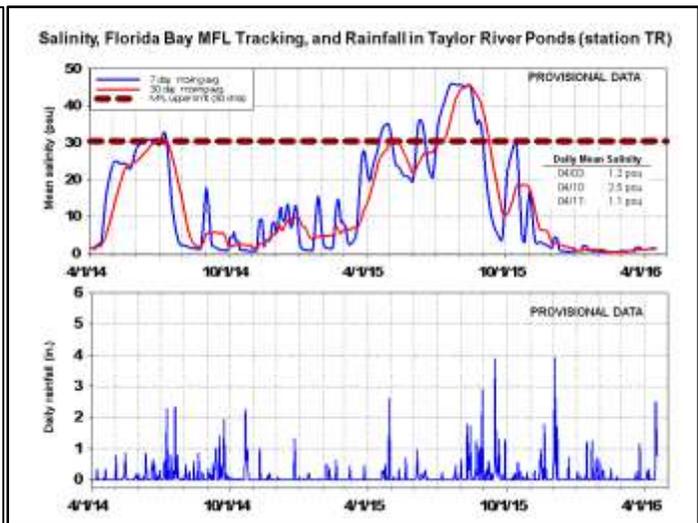
Everglades National Park (ENP) and Florida Bay: Water level changes corresponded to rainfall patterns this week; the southern areas increased and the northern areas decreased. Northern Taylor Slough remains about 17 inches above average, and southern Taylor Slough and the ENP panhandle increased to ten to 11 inches above average. Usually, water levels are decreasing at this time of year, so unless the current levels decrease faster, the area will continue to remain above average. Northern Taylor Slough is typically dry by mid-February but currently is 0.8 feet deep.



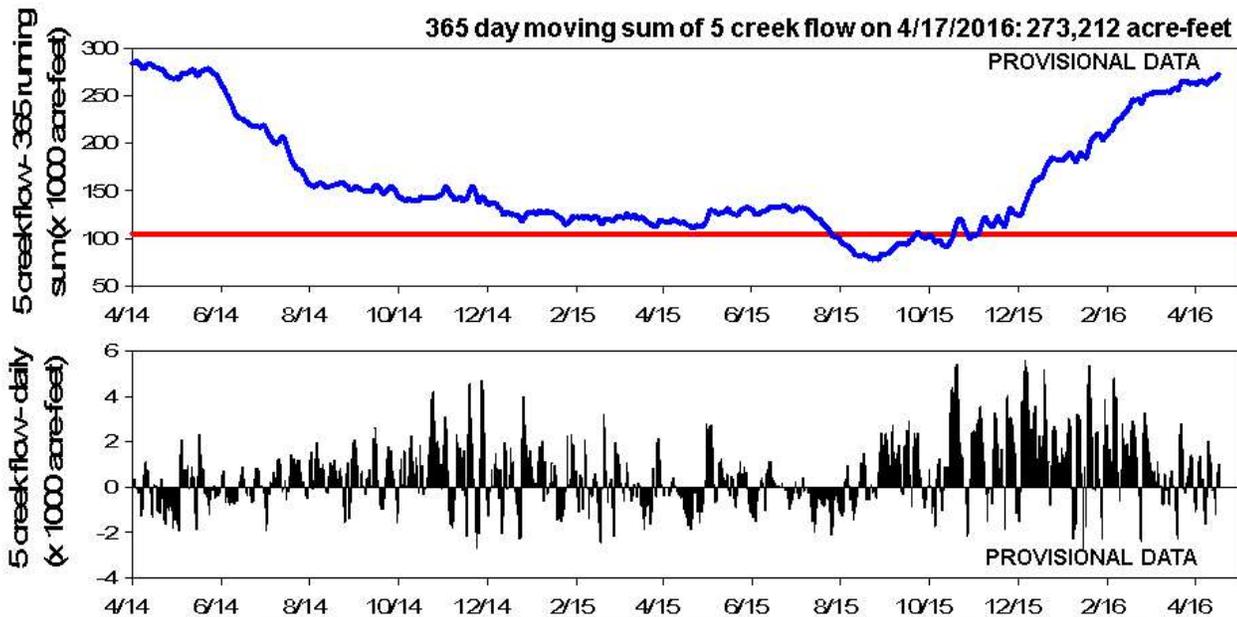
Salinities in Florida Bay were fairly stable last week with changes under 2 psu. All areas remain below average. The central and western bay are -3 to -6 psu below average with salinities ranging from 26 to 38 psu. The eastern bay areas are -5 to -10 psu below their long-term averages with salinities ranging from 16 to 25 psu. Below average conditions in salinity are desirable and are a restoration target.

Upstream in the mangrove ecotone, the daily average salinity at the MFL sentinel site TR decreased from 2.5 to 1.1 psu, below the seasonal 16 psu average. The seasonal averages of all stations will continue rising from now through June. The 30-day moving average salinity at the TR gauge rose to 1.4 psu (the typical 30-day value for this time of year is about 16 psu and rising).

The 365-day running sum of the cumulative flow from the five creeks feeding Florida Bay increased to 273,212 acre-feet this week, above the long-term annual average. The weekly (April 11 to April 17) cumulative flow from the five creeks increased to 2,377 acre-feet.



5 Creek Cumulative Flow and Florida Bay MFL Flow Criteria Tracking



Water Management Recommendations

- The average stage at gauges 62 and 63 in WCA-3A is now 10.70 feet (well below 11.60 feet), but reversals should be avoided. Florida Fish and Wildlife Conservation Commission anticipates opening the WCAs soon.
- Water levels at gauge 65 are now 2.35 feet deep, below the 2.5 foot depth monitored for tree island inundation and duration. Water depths should remain below 2.5 feet over this upcoming wet season to protect the island forests.
- In general, conditions remain too deep for wading bird foraging or nesting. While foraging conditions are suitable in WCAs 1 and 2A, few birds are foraging there yet. Once depths reach one foot, slower recession rates are desired through the end of May to support foraging.
- Small inflows into WCA-2A and northern WCA-3A may occur so long as they do not cause increases in stage. Lower stages throughout the WCAs are ecologically necessary for wading bird foraging and ecosystem improvement.

Recommendations appear in the summary table below. The red text represents new or modified information or recommendations.

Everglades Ecological Recommendations, April 19, 2016 (red is new)

Area	Current Condition	Cause(s)	Recommendation	Reasons
WCA-1	Stages changed - 0.06' to -0.09'	Rainfall, ET, management	Match inflows with outflows to achieve regulation schedule recession while allowing water levels to reflect variation in annual rainfall. Prevent repeated or ongoing reversals as much as possible.	Provide moderate recession rates to support wading bird foraging, necessary for successful nesting.
WCA-2A	Stage decreased - 0.11'	Rainfall, ET, management	Lower stages. Prevent repeated or ongoing reversals as much as possible.	Provide moderately fast recession rates to reach suitable depths for avian foraging and nesting. Once depths are approximately 1', manage recession rates to favor wading bird foraging (-0.05' to 0.12').
WCA-2B	Stages decreased - 0.10' to -0.15'	Rainfall, ET, management	Follow normal seasonal practices.	High stages generally preclude wading bird use, but can provide good habitat for wading bird foraging as stages decline at the end of the dry season.
WCA-3A NE	Stage decreased -0.27'	Rainfall, ET, management	Small inflows into WCA-2A and northern WCA-3A may occur so long as they do not cause increases in stage. Lower stages throughout the WCAs are ecologically necessary for wading bird foraging and ecosystem improvement.	Continue to provide moderately fast recession rates to reach suitable depths for avian foraging and nesting. Once depths are approximately 1', manage recession rates to favor wading bird foraging (-0.05' to 0.12') in northeast WCA-3A. WCA-3A and WCA-2A have been closed to the public because of high water effects on wildlife. Depths are much lower now (10.7') so the WCAs should open soon again.
WCA-3A NW	Stage decreased -0.17'	Rainfall, ET, management		
Central WCA-3A S	Stage decreased -0.23'	Rainfall, ET, management	Prevent repeated or ongoing reversals. Water depths at gauge 65 are below 2.5' (now 2.35'). Water depths should remain below 2.5 feet over this upcoming wet season to protect the island forests.	Continue to provide moderately fast recession rates to reach suitable depths for avian foraging and nesting. Keeping depths below 2.5' is important to allow tree island vegetation to recover from stress of the recent extended inundation duration.
Southern WCA-3A S	Stage changed -0.23'	Rainfall, ET, management		
WCA-3B	Stages changed - 0.09' to -0.15'	Rainfall, ET, management	Follow normal seasonal practices. Prevent repeated or ongoing reversals as much as possible.	Continue to provide moderately fast recession rates to reach suitable depths for avian foraging and nesting. Once depths are closer to 1', manage recession rates to favor wading bird foraging (-0.05' to 0.12').
ENP-SRS	Stage decreased - 0.03'	ET, rainfall, topography, management	Make discharges to the Park according to the ERTP rainfall plan.	Keep peat wet to promote native habitat and maintain wetland plant and animal communities.
ENP-CSSS habitats	S-12A and S-12B are closed to enhance dry-down.	Rainfall, ET, management	Follow rainfall plan for releases. Adhere to ERTP closures for S12-A and B. Maximizing flows through S333, as possible, is recommended. Follow guidance in C-111 western spreader canal project operations manual.	Provide appropriate hydrological and habitat conditions for CSSS.
Taylor Slough	10-17 inches above average	Rain, ET, inflows	Move water southward as needed	Provide freshwater buffer for ecosystems and maintain low salinity conditions downstream
FB- Salinity	-3 to -10 psu below average	Rain, ET, inflows, wind	Move water southward as needed	Maintain lower salinity levels.